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PROFESSOR OF PHYSIOLOGY AT THE UNIVERSITY OF PARIS.

MR. PRESIDENT, MY DEAR COLLEAGUES,—I am happy to find myself again among you and to affirm once more my ardent faith in the unity of scientific men in all lands, as well as my love for physiology. But we must at the same time show a wider and more noble patriotism in cherishing science, our common mother. Therefore, leaving politics on one side, I will plunge at once into the subject which I venture to bring before you.

Although it may appear that I am deserting the classical paths of physiology, this is not really the case. What is our classical physiology if not the searching for truth by way of experiment, of which my illustrious master, Claude Bernard, has established the guiding principles with such authority that it would be almost criminal not to follow them. To quote his words, "When you enter the laboratory, leave your theories in the hall with your overcoat." "But," added he, with a smile, "you will be able to resume them when you go out again." A favourite saying of Pasteur was that it is as necessary to sweep away the theories which encumber research as it is to sweep out the dust every morning from the laboratory.

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The subject of my discourse to-day is very revolutionary, and I expect to meet with severe criticism. But I would say, in the words of Themistocles: "Strike, but listen." Before judging me, hear what I have to say.

THE NEW SCIENCE AND ITS FORERUNNERS.

The thesis which I wish to sustain and to prove by the experimental method is that there may be a knowledge of reality obtained by other means than by the ordinary channels of the senses. Everyone knows that the external world is accessible to us by our senses, by vision, hearing, and touch, and to a less extent by smell and taste. No other ways are known. It is the universal opinion that we can have no other notion of the reality that surrounds us except through our five senses, and that any fact must remain for ever unknown unless sight, touch, or vision has revealed it to us. This is the classic and at the same time popular idea. It is formal and exclusive, without itself ever having been demonstrated. To admit that a knowledge of occurrences can arrive at our consciousness by any other means than those of the senses, is a daring and revolutionary proceeding, and yet this is the thesis that I am about to maintain.

I am, however, not alone in defending this position. I have precursors and supporters, especially among English men of science. In the first place I would mention Frederick Myers, of Cambridge, one of the most trustworthy and intelligent men that I have ever known; my illustrious friend, Sir Oliver Lodge, Sir William Barrett, the renowned William James, Mr. and Mrs. Sidgwick, the great Cesar Lombroso, my friends Ochowitz, Flammarion, A. de Rochas, Geley, J. Maxwell, as well as the professors Bottazzi, Foa of Padua, Morselli of Genoa, Schrenck-Notzing of Munich, Herlitzka of Turin, all eminent physiologists, as well as many others whom I cannot enumerate here. I am thus not in bad company, and this fact may give me heart of grace to proceed. Indeed, we have not the right to reject summarily the mature opinion of these thinkers, who have all been scrupulous and painstaking experimenters. But I shall not appeal to their authority, nor say: *magister dixit.* I shall rely only upon observation and experiment.

I have tried to find a name for this new science, which though a chapter of physiology, does not make use of its ordinary technique. Just as Aristotle called the science which was beyond physics, metaphysics, so I propose to call this science which goes beyond the ordinary psycho-physiology, metapsychics. I have divided it into two distinct groups—namely, (1) subjective metapsychics, which deals only with the phenomena of consciousness, and (2) objective metapsychics, dealing with the external phenomena which are not explicable by the ordinary laws of mechanics.

To-day I shall not say anything about objective metapsychics and shall confine myself to the psychological phenomena, not wishing to administer to you too strong a dose of revolutionary poison. And even in speaking of subjective metapsychics, I shall say nothing of that strange phenomenon which clashes so violently with all our notions of moral liberty—i.e., premonition, revelation of events which will occur in the future. Though I have a firm belief that such cases of premonition do occur, I shall to-day confine myself to the attempt to convince you that a knowledge of the real world can arrive in consciousness in other ways than through the ordinary channels of the senses. The audacity of my thesis will be sufficient excuse for such limitation of my subject.

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A young girl, named Bertha, in New Hampshire, disappeared, and it was thought that she was drowned in a neighbouring lake. Repeated search at the bridge and in the lake gave no result. Two days afterwards, Mrs. Titus, an acquaintance of William James, who lived 8 kilometres away, dreamt that she had seen the body of Bertha in the lake at a spot which she localised accurately. A diver descended at this spot and found the body. More than a hundred people had been looking in vain for the body for two days.

Mrs. Green, of London, dreamt that she saw two women whom she did not recognise in a little carriage, and that the horse fell into the water, that two hats floated to the surface, and that the two women were drowned. On awaking, she described her dream. Now at this very moment, at the

same hour allowing for the difference of longitude, a niece of Mrs. Green, whom her aunt did not know, in Australia, went for a drive with a friend and was drowned. The two bodies were found, the hats were floating on the surface of the water. The details, which are well authenticated, are so numerous and precise that the law of probability would show enormous odds against such a dream being a mere coincidence.

But of course one cannot raise an edifice on a single stone. There are hundreds of similar cases, and it is especially the English workers who have collected them with zeal and patience.

Mr. Wingfield, on waking on his yacht, sees his brother appear in his cabin, pale and sad. Much frightened, he goes into another cabin and writes in his diary his brother's initials, followed by "God forbid," and the date and hour of the apparition. At the same hour his brother, Richard Baker, was killed while hunting in England by a fall from his horse.

Mr. Smith, employed at a bank in London, comes home after dinner and is talking quietly with his wife. Suddenly he stops and says: "What time is it?" "It is 8.45." "Very well, then Fred has died at 8.45. I have just seen him." It was found that Fred had died exactly at this minute.

Victor Hugo, in his "Choses Vues," relates a similar instance. Mme. Guérin says to her daughter: "I have just seen Mme. Lann pass; she died an hour ago." And it was correct. Mme. Lann had not been at all ill.

Four Possible Explanations.

I could quote a much larger number of similar occurrences, and it seems to me that they are demonstrative. Nevertheless we must discuss them. Four explanations are possible.

1. We might be dealing with defective or fraudulent observations. Now in the larger number of these cases the hypothesis of fraud is inadmissible. Out of the hundred which I might quote there has not been a single one where there has been deliberate falsehood; but their record may have been incomplete and inexact, and this is indeed probable, since in spite of all precautions certain facts have been reported inexactly. If we admit, to be extremely strict, that half of these cases have been inexact, and even with an exaggerated severity we exclude them altogether, there will still remain 50 of which the accuracy cannot be disputed.

2. The second hypothesis is that chance will account for all. Chance is, indeed, a very convenient god, to which we can always appeal. But why should we introduce these extremely small probabilities into our calculations? Practically we never come across a probability of 1 to 100 million, and yet this is the figure at which one must assess the probability of Wingfield having once in the course of his life a single hallucination, and that just the hallucination of his brother being killed at the same moment. Chance will evidently not explain these occurrences.

3. The spiritualists have adopted a much simpler explanation—that the astral body of a dead man returns. Such an explanation does not satisfy me, since many trivial warnings occur, in which there is no question of a death, and because it is generally, if not always, subjective, the phantom being seen only by a single person. Above all, physiology teaches us explicitly that all thought disappears with the death of the brain. Anæmia, asphyxia, intoxication, concussion, and compression of the brain interrupt its activity to such an extent that it is almost impossible for any physiologist to admit that any personality or consciousness can exist when the brain has ceased to function.

4. The fourth proposition is neither an explanation nor an hypothesis but is a simple enunciation of the fact, which is confirmed in a startling manner by experiment, that the occurrences of the external world, even when they do not affect our sense organs, can still influence our consciousness. By what channels I do not know, but the fact is there. Reality comes to us and then the knowledge of this reality takes a symbolic form, as in a dream. The unconscious part of Mme. Guérin is warned that Mme. Lann is dead, and in order to bring this fact to the conscious personality of Mme. Guérin her unconscious self imagines a dream. Hence comes the innumerable variety of these symbolic dreams, which all tend to the same result—a knowledge of reality, even though this knowledge arrives by mysterious and unknown channels.

But however important these observations, which would suffice alone by their number and precision to make us admit that we are endowed with a hidden form of sensibility, which I call *cryptæsthesia*, there is a whole mass of still stronger evidence to demonstrate its existence. It is true that one cannot bring an observation into existence, but one may provoke it. Now, an observation that has been provoked, what is that but an experiment?

THE EXPERIMENTAL DATA.

We may consider the experimental data under two heads: (1) those observed in persons in the hypnotic state or in the so-called spiritualistic trance, (2) those which have been observed in normal individuals. Both sets of experiments are equally valid and lead us to the conclusion that, in addition to ordinary sensation, there exists a mysterious hidden sensibility—a *cryptæsthesia*.

In Hypnotised Individuals and Mediums.

In the first place, in hypnotised individuals or in mediums we obtain unmistakable proofs of clairvoyance. I will here record certain experiments which are known to me personally.

Alice has never seen Dr. Héricourt and has never been in his house. Héricourt gives me a drawing enclosed in an envelope carefully sealed. The drawing represents a frame in which he can put a photograph. Now Alice says to me: "I see a man—a soldier, with a képi and three stripes on the képi." That was exactly the photograph contained in the frame when Héricourt was drawing the frame alone. Just think of the number of things that Alice might have said—a circle, a cross, a bridge, a sheep, a gun, a horse, a farm—in fact, quite a dictionary, and you must acknowledge that the probability of her saying a soldier with three stripes on his képi was infinitesimal.

My pupil and friend Langlois, whose death three weeks ago we deplore, was making an experiment with me in the laboratory. In the evening I asked Léonie, who was at that time the only person beside myself in my house and who could not have seen anyone coming from the laboratory: "What has happened to Mr. Langlois?" She replied to me brusquely: "He has burnt his hand with a red liquid. Why does he not take care when he is pouring it out? The skin was blistered at once." As a fact, Langlois, in preparing a solution of hypobromite of soda, had spilt a pretty large quantity of bromine on his arm, causing a severe burn.

With Stella I have had convincing results in experiments with one of my friends, G., a clever and sceptical physician. Stella knew neither him nor his family. He asked her: "What is the name of my son?" Stella, by means of the table, which he was not touching, replied: "Jean," and added "rit voiture." Now G. had given to his young son a carriage, with which the child was greatly amused. G. asked again: "What is the name of a brother whom I have lost?" Reply: "André." G. said "No," and thereupon Stella said: "André, il vit." Now G. has a brother living who is named André.

I gave to Miss Thompson, in presence of F. Myers, my eldest son's watch. Miss Thompson said at once that there was blood on this watch, and she added these words, surprisingly exact: "Three generations mixed." This watch had belonged to an uncle of my son, George, who had been killed in 1870 at Vendome. His father had recovered the watch and had presented it to his grandson, my son George. Of course, Miss Thompson was ignorant of all these details.

The most striking of all the facts of cryptæsthesia is perhaps the following. In June, 1906, at 10.30 P.M., in the presence of two of my friends, Mme. R., by means of table-raps, gets the message: "Banca;[1] la mort guette famille." But no one present knew Bianca, for I imagined that Banca stood for Bianca. The next day, at 2 P.M., the news arrived at Paris of the cowardly assassination of Draga, the Queen of Serbia. At the time I saw no relation between

[1] Or rather Pandja. The dj is a letter peculiar to the Serbian alphabet.

this occurrence and the words given by the raps, but the next day I read in the papers that the father of Draga was called Panca. Without insisting on the details of this extraordinary occurrence, I will only say (1) it was impossible for anyone present to know anything of Serbian affairs, and they were totally unacquainted with the names of Draga and her father; (2) the coincidence of the time is exact to the minute, 10.30 at Paris corresponding to midnight at Belgrade. The warning was given at the very moment when the officers left their hotel to go and murder Draga and her two brothers; (3) "la mort guette famille" expresses with amazing precision the blow which was about to strike the family of Banca; (4) the family was sufficiently eminent to be able to establish the authenticity of the warning. If in the whole world death was threatening three persons in any one of 20 families, I could have heard nothing of it if it had not been a princely family.

I have tried to calculate the probability of this wonderful warning. For the word Panca, it is approximately $(1/25)^5 \times 1/7$, but for the words "la mort guette famille," the probability is still smaller and is only about $(1/10)^{10}$. But what does it matter if there are two or three noughts more or less? This infinitesimal probability gives us a moral if not a mathematical certainty that mere chance can have nothing to do with it.

Mrs Piper.

I come now to experiments made by various savants on Mrs. Piper. She is an American who has given the best examples of clairvoyance that I have ever known. Since three thick volumes of them have been published, it is evident that I could only give here a very meagre summary, and I shall confine myself to mentioning the conclusions of the eminent men who have questioned and studied Mrs. Piper.

Richard Hodgson, very sceptical, who had already made an inquiry in India in order to control the assertions of Mme. Blavatsky and had concluded that there was fraud involved, studied Mrs. Piper for four years. He makes the following positive statement:—

"I have brought nearly fifty people to her, after taking all possible precautions to prevent her obtaining any information about these people. They were informed by Mrs. Piper of intimate facts which she certainly could not know beforehand. Even detectives were employed to make sure of this."

Now William James says:—

"I am absolutely certain that Mrs. Piper during her trance shows a knowledge of things of which it is impossible for her to have had any knowledge during the waking stage."

Frederick Myers said:—

"Messages were given to me and certain circumstances indicated, which it was impossible for Mrs. Piper to have known about. Certain facts enunciated were suppressed in the report as too intimate. Many of these facts could not have been found out even by a clever detective, and many other facts could only have been discovered by means of an improbable expenditure of time and money."

Sir Oliver Lodge says:—

"Much of the information furnished by Mrs. Piper has not been acquired by ordinary methods. The knowledge that she has of things and persons could not have been arrived at by the ordinary channels of the senses."

James Hyslop arrived at the same conclusions after three years of patient investigations.

Well, gentlemen, if men like Richard Hodgson, James Hyslop, William James, Frederick Myers, and Oliver Lodge, affirm, after prolonged investigation, that the normal senses do not suffice to explain the replies and the revelations of Mrs. Piper, we are not entitled, without incurring the reproach of unjustifiable blindness, to throw their assertions into the waste-paper basket or to consider them on a priori grounds as lying or erroneous.

It is true that in Mrs. Piper's case an explanation has been given which I do not consider legitimate. The facts are undeniable. But instead of supposing, as I have done, that it is the unconscious intelligence of Mrs. Piper which has obtained this knowledge by channels at present unknown to us, Oliver Lodge, R. Hodgson, and even Myers, have preferred to assume that a human personality—that of a dead person, a spirit—has undergone incarnation in Mrs. Piper, and speaks by her voice, writes by her hand, thinks by her thought. This is the spiritualistic theory, which I cannot accept, even though in this special case it seems to furnish a very convenient and satisfactory explanation.

I do not wish to discuss this here. It is only a hypothesis, a theory, whereas I am resolved to remain on firm ground and not to lose myself in the clouds. Hundreds of positive experiments teach us that Mrs. Piper knows things which neither her sight, her hearing, nor her power of touch could have taught her. I merely adduce this as an authenticated fact, without wishing to pursue the subject further; since the spiritualistic theory rests on a very shaky basis, as, indeed, do all other theories which have been put forward to account for cryptæsthesia.

Three Other Instances of Cryptæsthesia.

Thus, if there were only the case of Mrs. Piper, it would be sufficient to establish the fact of cryptæsthesia (or supernormal knowledge). But there are many others of old or recent date which cannot be doubted. I will only quote three, although I might give a hundred or more.

1. From a villa in the centre of France a botanist starts on a mountaineering excursion; he does not return that evening nor the next subsequent days. Search-parties are sent out, soldiers from a regiment in the neighbourhood explore all the adjacent valleys, but in vain. At the end of a fortnight, a somnambulist, questioned by Dr. Osty, indicates the exact spot, where in fact the body of the unfortunate botanist is found, at the bottom of a precipice.

2. Mr. Myers is visited by a distinguished Dutch physician, M. F. Van Eeden, living at Bussum. Every precaution is taken to ensure Mrs. Thompson's knowing nothing about him, but when in an hypnotic condition, she says that his name is Bussum and that he is a gardener at Eeden. Mr. Van Eeden had brought a piece of a garment belonging to a young man who had committed suicide without informing anyone. Mrs. Thompson gives his Christian name and adds that he had blood on his throat, which is in accordance with the manner of his death.

3. One evening, on July 31st, 1914, in a retired suburb of Paris, Count Ugo Baschier (gifted with remarkable powers of clairvoyance), suddenly remarks while in a spiritual trance: "A very important personage is about to be assassinated; what a quantity of blood. What time is it?" "It is 21.40 o'clock." "Well, something is happening near the Boulevard des Italiens." And, as a matter of fact, at 21.35 o'clock the great orator, Jaurès, was assassinated by an individual who had not divulged to a soul his intention of committing this infamous crime.

Are not these instances sufficient to justify the conviction that there are other ways of attaining knowledge than those through the ordinary senses?

In Apparently Normal Persons.

Further I will adduce other facts, possibly even more demonstrative, since they do not refer to persons in a state of trance or of hypnosis, but to others, still rarer and quite exceptional, who, when in an apparently normal condition, give evidence of second-sight, clairvoyance, cryptæsthesia.

Dr. Chowrin, superintendent of the asylum at Tambow, had under close observation over a prolonged period a woman, Mme. N., who was subject to grave nervous trouble. She could read letters that had been carefully sealed, and written so small that they could not be deciphered without a magnifying glass and enclosed in sensitive photographic paper. It was definitely ascertained on opening the envelope that it had not been tampered with. Before a medical commission Dr. Andreeff writes: "In the sands of Arabia there grew three palm trees, between which flowed a gurgling stream." Mme. N., taking the sealed letter, says: "A vast country, it is sand, three trees, very tall, I have never seen anything like it, a stream of which I can distinctly hear the murmur."

Mr. Resse, a Polish Jew, now in his eightieth year, a naturalised American, has given striking proof of cryptæsthesia before Edison, J. Maxwell, Schrenck-Notzing, Hereward

Carrington. Maxwell writes different questions on seven pieces of paper. Resse did not handle any of these papers, but gave exact replies to the seven questions. On one J. Maxwell had written: "What is my mother's name?" Resse replied: "Mary Angelina," an uncommon name of which he had certainly no previous knowledge. Schrenck-Notzing considers that Resse is one of the most extraordinary men of our time. On five pieces of paper Schrenck-Notzing had written different questions. Resse scarcely touched them and could not possibly read them, but he replied to each question. "What is my mother's name?" "When are we going to Germany?" "What is my eldest son's name?" &c., without any (normal) knowledge of the matter.

Prof. Schottelius at Stuttgart, Mr. Heymans at Groningen, Herr Tischener at Munich, Prof. Lombroso at Turin, all give analogous instances, equally striking.

In Paris Miss Briffaut, without entering into a trance or hypnotic condition, gave marvellous proofs of clairvoyance. My learned friend, the eminent physician, Arnaud de Gramont, pays her a visit under an assumed name. She tells him that his son was called S. . . . and that his name ended in *mont* (Sanche de Gramont), that he was an aviation officer, and that he had been killed, which was unfortunately true. Without disclosing her name, the Marchioness de Montebello goes to see Miss Briffaut, who says to her: "I see L. Louis (Madame de Montebello's son was called Louis). He was killed in the war, it is your son." "No," replied Mme. de Montebello. "All the same, he shows me that he had a sudden death." Now Mme. de Montebello's son had before the war been killed by lightning.

My daughter, Mme. de Ber, goes to see Miss Briffaut, who knows her name. Miss Briffaut speaks to her of my dear son A., an officer in the Flying Corps who was killed in the war, whom she may have known. But she repeated to my daughter an intimate conversation which she had with him two years before the fatal event, and which she had never divulged to anyone.

THE FACTS CANNOT BE DENIED.

Now, my dear Colleagues, these facts cannot be denied. To adopt the weighty words of Sir Oliver Lodge, "to deny them is to belittle oneself with the excuse that they are not in accordance with the principles of that commonplace classical science which we teach." Moreover, with Geley and other learned psychologists, I can myself bear witness to similar facts even still more astonishing and demonstrative if possible. I may quote the powers of a distinguished Polish engineer, Mr. Stephan Ossovietzki, who does not, however, care to make these experiments though he is invariably successful when he undertakes them. In bright light he takes the sealed and opaque envelope offered to him, feels it vigorously without looking at it, presses it, crumples it, and then declares its contents. Neither Geley nor I take our eyes off the envelope and we open it ourselves. We do not know the contents since it was addressed to me by Miss de Noailles, who is not present. Stephan, after taking the letter, says to me: "It is the inspiration of a French poet, perhaps Rostand; they are the verses of Chantecler, recited by the cock. I see the night and the light." Now Miss de Noailles had written: "C'est la nuit qu'il est beau de croire à la lumière. Edouard Rostand." These verses from Chantecler are said by the cock.

My illustrious friend, Sarah Bernhardt, sends a sealed letter to me in Warsaw, which I keep carefully from the moment the postman delivers it to me until I give it to Ossovietzki, who feels it, presses it in every direction, while Geley watches him assiduously, and says: "Life appears humble to us because it is . . . . (a word so French that I cannot read it—a word of eight letters)." Sarah Bernhardt had written: "Life appears beautiful to us because we know it to be ephemeral." I have made drawings which Stephan has reproduced faithfully. One paper he was able to read was enclosed in a leaden tube. Another time I wrote the word "thou" on a paper which I rub into a little ball in my hand. Ossovietzki reads "thou." No cheating had been possible. I am as certain of this as of my own existence, and in order to attest my faith I should not hesitate to condemn a man to death on the strength of it. When a jury condemns a man to death they have less certainty than I have of the genuineness of my experiments.

A NEW CHAPTER IN PHYSIOLOGY.

Gentlemen, I have now laid before you the facts, and I venture to hope that your minds will no longer be open to doubt in spite of the novelty of my conclusions. You will agree with me that other means are open to knowledge than those of the normal senses; that hypnotics, that mediums, or whatever they may be called, exist. We can sometimes apprehend truths which neither sight, hearing, nor touch can fathom. If I have been desirous of addressing you on these matters in this important meeting, it is because I consider them to be an outcome of physiology. Yes, it is a chapter of physiology, a new chapter which I want to introduce into our classic science. And I think too highly of the wisdom of physiologists to doubt their admission of what experiment has demonstrated. It would be as if they said: "I no longer believe in the experimental method. I have my theories, and the experiments that you adduce, however elaborate, numerous, or methodical they may be, have no power to change them."

But you will not commit this sacrilege. You will forget your theories and you will bow to facts. For the facts are there, in quantity, and inexorable. Claude Bernard, the master of us all, did not care for theories; he established facts and he laughed at theorists who set up against him the vulgar, so-called common classic opinion. In the same way, when objection is taken to these exact experiments, to these minute observations, as being opposed to the ordinary conception, to the opinion of Aristotle, of Locke, of Descartes, of Claude Bernard himself, I have the right to smile.

I have often been told that courage was needed to sustain my opinions on cryptæsthesia. This is a mistake. No courage is needed to defend truth. On the contrary, courage is needed—a bad courage—to deny the value of experimentation, to throw without examination into the broad ditch of errors this formidable weighty collection of undeniable facts, more especially since this new physiology will not alter anything in the other physiology. It adds something, it destroys nothing. The pneumogastrics will continue to stop the heart, strychnine will continue to produce convulsions, the respiratory quotient will have the same number. The fact that our intelligence perceives unknown vibrations does not modify in any way the laws of sensory perception. Fechner's law still remains intact.

Perhaps it is not sufficiently understood that there are *contradictory* facts as well as *unusual* facts. The access (to our subconscious intelligence) of these mysterious vibrations is an unusual phenomenon, but it is a phenomenon which is not in contradiction to anything. It is a new truth, that is all. And this new truth is wonderfully in agreement with the amazing notions which modern physics opens to us. At this moment I cannot hear any concert in this hall, nor do you; you might even assert that there are no musical vibrations here. What a mistake. If a wireless receiver were placed here, we should all immediately hear a concert that is taking place perhaps three miles or even 100 miles away. The receiver proves that the vibrations are present. Thus it is with these mysterious paths of consciousness; they do not reach us, but they are there. Only a sensitive person, in other words, a receiver, is needed to prove their reality. Therefore do not hesitate to accept this new fact that unknown vibrations strike an intelligence and bring to it unexpected knowledge.

Here is a field spread out for your investigations. It is true that the difficulties are great. But when has difficulty turned us away from the study of any problem? On no account be put off by the credulity of the spiritualists. I do not wish to speak ill of the spiritualists, in spite of their having frequently been hard upon me. But we do not share the same principles. I believe only in science, experiment and observation. But they have ready-made theories. They start from the idea that there is a survival of the soul and they endeavour to find in the facts a confirmation of this conviction. I certainly do not

deny that their theory deserves to be examined. In spite of puerilities and absurdities it subsists; although terribly fragile, it often gives a more satisfying explanation than any other. All the same I cannot make up my mind to accept it.

ATTITUDE TOWARDS FURTHER STUDY.

Before a theory is established the facts must be examined. This shall be your task, my dear colleagues. I should like to see physiologists of ripe experience bring their powers of careful inquiry to this attractive study of cryptæsthesia. They must first read the literature on this subject, and become acquainted with the experimental methods which we have, among us, initiated, and perhaps invent others. And the harvest will be abundant. For if you have, as I am assured, faith in science, do not remain shut up in the old structures where too often it is confined. March boldly forwards. Do not fear light and air. Look around how all is transformed. Physiology has no right to remain a backward science, when her great sister, physics, takes such a lofty flight. We now know that there are vibrations everywhere, even when we cannot directly apprehend them. Therefore why not admit that certain vibrations exist which strike the intellect in order to bring to the brain knowledge through this?

Can physiologists and medical men assert that they have completed the physiology of the brain? that there is nothing further to be discovered about it? and that they have delimited all the modes of vibration of which it is capable? The brain is a much more complicated machine than we are wont to consider it in our innocence. Why may not this marvellous machine be sometimes capable of perceiving vibrations which pass unknown to consciousness? This, my dear colleagues, is physiology. Study this special sensibility of the brain. Give all your mind to this study. According to a formula which is dear to me: Be as bold in hypothesis as you are thorough in experiment. At present we understand nothing about the phenomenon of cryptæsthesia, and we shall very likely long remain in this condition. But, indeed, have we really ever understood anything adequately? Is not everything a mystery, even in the case of phenomena which have been the most studied and from the earliest times? How does nervous vibration cause the muscle to contract and then to burn up the sugar? How does light acting on the retina provoke the phenomena—and strangest of all—the idea of light in a living consciousness? How can two gases in combining give a substance which is a liquid and yet their atoms continue unchanged? How is it that there are stars whose light takes 30 millions of years to reach us? We understand nothing at all of this, yet all this is science. For science has not the pretension of understanding facts, but of establishing conditions.

To you, my learned colleagues, to you, the young men who are listening to me and who perhaps feel some confidence in an old man, who, in spite of his age, is still in love with science, to you all it falls to determine the laws of this new chapter in physiology. Have confidence in science and do not fear to consider the experimental method as the supreme guide. Science will travel much farther than our stunted science of to-day. We have sometimes been tempted to think that the facts discovered by our contemporaries were final, and to assign a limit, not very far distant, and a future not very brilliant to our present-day science. Balances, telescopes, microscopes, thermometers, galvanometers, always more delicate and more precise, have been to some degree forming our very near horizon. But here we may enter a new world, scarcely explored, before which we stand amazed like a Hottentot before the Hertz waves, the Pasteur microbes, and Einstein's relativity. This new world is the unknown, the future, it is hope itself.

I firmly believe that you are destined to penetrate into some of these mysteries. It will be to the honour of physiology. And more than ever I believe that great destinies await it.

A CLINICAL CONTRIBUTION TO THE ÆTIOLOGY OF ACTINOMYCOSIS.

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THIS contribution is concerned primarily with the record of two cases of actinomycosis, but inasmuch as they are cases of more than usual interest from the ætiological standpoint, it has been thought worth while to include some account of the hypotheses that have been advanced as to the life-history of the infecting organism, the main arguments that have been adduced in support of each, and the stage of the argument at the present time.

Although granules had been noted as early as 1845 in pus from a case of spinal caries by von Langenbeck (recorded by Israel, 1878), and by Lebert in 1848, the first correct explanation of their nature (a central portion of mycelium with circumferential clubs) was given by Harz in 1876, who investigated the granules obtained by Bollinger from a case of the disease in cattle, and who proposed the name of *Actinomyces bovis* for this parasite. Some years previous to this (1868) Rivolta had also reported on the granules obtained from tumours of the jaw in cattle, though not so accurately as Harz; later on Rivolta claimed priority of discovery, and suggested the name of *Discomyces bovis* (1878). In 1878 Israel recorded the first case in man, and his later researches, and those of Ponfick and others, established the identity of human and bovine infection. Acland was the second observer to demonstrate the lesion of actinomycosis in man. In 1884 Nocard published a report of the first careful study made in France of a mycelial disease in animals. He also, four years later, showed for the first time in that country a case of human actinomycosis. His patient researches into the subject have led, in view of certain objections that can be made against other names, to the attachment by some authorities of the term "nocardia" to certain forms of mycelial disease. When an attempt was made to isolate the mycelium in artificial media, different investigators reported different organisms, and mycelial diseases now known to be quite distinct from actinomycosis were investigated.

The Work of Bostroem and of Wolff and Israel.

For the moment we will only consider the work of two earlier investigators, inasmuch as their results indicate the two conflicting hypotheses with regard to the life-history of the ray fungus, about which there is still controversy. (1) Bostroem isolated from several cases an aerobic streptothrix, easily grown even at air temperature. This, as a result of laborious investigations, he found to be more or less akin to the mycelial parasites which affect grasses, especially in marshy districts. He therefore advanced the theory that the normal habitat of the organism is inside the husks or sheaths of barley and other grasses, and is conveyed from such sources to the mouth, where it gives rise to the characteristic lesion. This theory attracted considerable attention and has become the traditional teaching of the lecture room and text-book. (2) Wolff and Israel reported an anaerobic streptothrix, difficult to cultivate, growing best at body temperature. An alternative hypothesis follows from the results of these careful investigations, which has recently been pushed to its logical conclusion by the work of Homer Wright. It is that the organism is an inhabitant of the mouth (especially in connexion with carious teeth) and of other parts of the alimentary tract, and that in the presence of certain factors, one of which appears to be the presence of a foreign body (even such as husks of barley or blades of grass), is able to invade the tissues.

Terminology.

The inquiry began, as we have seen, around the granules associated with the disease that Bollinger described, but the interest of investigators soon tended

to centre round the mycelium. It has been found that when a branching mycelial structure alone without granules is considered, the field of investigation is very much widened. Thus widely divergent diseases have been proved to be due to mycelial organisms, the relation between which is at present a matter for conjecture. Moreover, these organisms have been described and classified from the independent standpoints of the pathologist and the botanist, with the result that the nomenclature in the literature is very confusing. For practical purposes it has been found convenient to limit the term actinomycosis from the clinical standpoint to include those lesions only which present themselves as chronic inflammatory conditions tending to form abscesses and sinuses, from which the typical granules can be obtained. This clinical limitation is open to the objection that the same description would apply to the lesion of madura foot, but in the absence of a definite laboratory grouping, it seems to be the only possible one for the present.

With this limitation in mind, it is only necessary to note the usage of the following terms, their multiplication being due to conflict between pathologist and botanist.

Actinomycosis (*Actinomyces bovis*), suggested by Harz and Bollinger, and used with the above limitation.

Discomycosis (*Discomyces bovis*), suggested by Rivolta, with the same limitation.

Nocardiasis (*Nocardia*) was employed by Toni and Trevisan for the whole group of mycelial diseases, and has been used by others for the non-granule-forming groups.

Streptothricosis (streptothrix) was put forward by Cohn as a generic term, and has been adopted in Cohn's sense by the London Pathological Society.

Coni-streptothrix was suggested by Pinoy as an alternative to streptothrix, a term employed previously by botanists for another organism.

The Granules.

Since the granule is of such importance in the diagnosis of this group, it is necessary to inquire into the structure and significance of the whole and of each of its constituent parts. Typical granules consist of a central matted mass of branching mycelium with radiating club-like structures peripherally. They are easily visible to the naked eye, are of an ovoid or round shape, sometimes yellow, sometimes white, and are usually described as "fish-roe" or sulphur granules. If a little pus suspected of containing granules is shaken up vigorously in a test-tube with distilled water, the granules will, if present, settle quickly to the bottom of the tube, where they may be examined with a hand lens. A molecule of cellular debris in pus may give the appearance of granules, but is not usually so round, and, moreover, it disintegrates fairly readily when shaken up with water, or may not settle so readily. A granule should always be crushed and stained before a diagnosis is made. If crushed between a slide and cover-slip, the structure may be seen with a hand lens to consist of a transparent central portion and a granular opaque periphery. The former contains the mycelium, the latter the clubs (if present), usually surrounded by pus cells. Before attempting to grow the organism, the granules are washed in relays of sterile distilled water.

Significance of the Granule.

The majority of recent researches tend to show that by far the most common organism associated with clinically typical actinomycosis is the anaerobic mycelium of Wolff and Israel. The relation of Bostroem's aerobic mycelium to clinical actinomycosis is not as yet determined. Homer Wright suggests that this observer may have been working with either a cultural or a secondary contamination. An organism closely allied to Israel's gives rise to a lesion which Poncet described as pseudo-actinomycosis. Here the clinical course is less severe and more amenable to treatment, while the granules are supposed to be larger and scantier and the mycelium thicker. This form is aerobic but grows best at body temperature.

Other observers have also isolated different organisms in a small number of cases. Colebrook notes two atypical strains, both giving rise to granules, and suggests the restriction of the term actinomycosis to those cases caused by Wolff and Israel's fungus, and the application of the term para-actinomycosis to the remainder of this granule-producing group. Foulerton has described several pathogenic organisms under the names of *Streptothrix hominis* 1, 2, 3, and 4. He does not lay much stress on the presence or absence of granules, to which the majority of observers attach much importance.

In addition to conditions such as the above, granules have been found in certain bacillary infections: (*a*) Lignière and Spitze described an organism which they called "the actino-bacillus." Griffiths says this bacillus gives rise to the majority of cases of actinomycosis in cattle, but Colebrook found only one case on record of human infection with this bacillus. Foulerton maintains that this organism is really a streptothrix. (*b*) Colebrook found a mobile Gram-negative bacillus causing granule formation in the contents of an abscess in connexion with a tuberculous kidney. This he considered a secondary infection of low pathogenic power.

Branching Mycelium.

This consists of slender threads which show irregular but true branching, and sometimes fragmentation of the protoplasm which gives a faint resemblance to strings of cocci. Such branching forms have been found in many isolated cases of unique pathological conditions, and may frequently be found living as saprophytes in the mouth and other situations. In the granules they occur as a thick felted mass with a general tendency to a radial arrangement, and are stained by Gram's method.

The demonstration of branching mycelium is necessary for the diagnosis of the actinomycosis group (due allowance being made for the tendency of the mycelium to break up), but the presence of this structure alone is not sufficient for the diagnosis in the absence of granules. It is not absolutely settled yet whether this distinction between granule-producing and non-granule producing streptothrices holds rigidly. It is quite conceivable that a pathogenic streptothrix may, under certain conditions, form the aggregations of filaments that make up the granules, and under other circumstances fail to do so. Certainly if the organism lives in the mouth as a saprophyte, as the second hypothesis demands, granule formation must be in abeyance.

Certain streptothrices known to be usually saprophytic are frequently met with, the best known being found in the mouth—e.g., Goadby's *Streptothrix buccalis*. Mycelial forms can be demonstrated fairly frequently if smears be taken from the contents of the cavities of carious teeth. It is, however, by no means certain that even those organisms definitely regarded as saprophytes cannot, under certain conditions, become pathogenic. Thus, according to Chalmers, Goadby's *Streptothrix buccalis* is the same organism as that which Hesse recovered from a case of inguinal and spinal granule-containing abscesses, and to which he gave the name *Cladothrix liquefaciens*. The question then arises: If fragments of branching mycelium are found in any lesion of the mouth, or in any abscess or sinus in the neck, does this necessarily mean that we are dealing with a primary streptothrix infection? The answer is probably in the negative, for the other possible explanations of such a lesion are: (*a*) An actinomycotic lesion: It may be that on examining smears from healing actinomycotic sinuses, branching mycelium will be found without granules, while if scrapings be taken from the wall of such a sinus, granules may be found either on lens examination or after histological section. (*b*) A secondary (saprophytic) streptothrix infection. This must be considered when some other specific lesion is present which will account for the onset of the clinical lesion, when no granules are found on scraping, and when the condition heals readily after proper surgical treatment of the original infection. When a leptothrix (non-branching mycelium) is found in association with lesions about the mouth, it is usually believed that

this infection is secondary and saprophytic, and it must be remembered that some of the streptothrices of dental origin do not usually appear to be any more harmful than a leptothrix.

I have found mycelial forms in smears taken from a sinus of the cheek in connexion with an alveolar necrosis, and also from a sinus in the neck that had resulted from tuberculous glands. Moreover, scraping from the sinuses showed no granule formation, and surgical measures dealing with the necrosis in the one case, and the tuberculous glands in the other, resulted in cure. In these cases my investigations were limited, as attempts at culture yielded a heavy mixed infection, and no growth of mycelium was obtained. I cannot find any record of cultural observations from such cases in the literature of the subject.

In a research into the mycology of tumours, Leyton isolated streptothrices from many tumours. He did not claim that the streptothrix was the cause of the tumour, nor would many pathologists be found to support such a view. It follows, then, that the streptothrix is an addition to the tumour, perhaps of no great pathological moment. If this conclusion as to the saprophytic nature of organisms found in relation to neoplasms is admitted, it should not be difficult to accept it with regard to those found in sinuses and abscess cavities near places where such organisms are known to exist. Further, Homer Wright is apparently of the opinion that Bostroem, in his historic researches, must have worked either with contaminating cultural organisms, or else with secondary invaders of the lesion. On this second supposition one of the comparatively harmless secondary streptothrices may even be found in a lesion originally caused by actinomycosis.

The Clubs.

It is necessary to state that some confusion has arisen in the use of this term. Thus it has been applied to ball-like swellings that are found on the hyphæ and elsewhere in certain mycelia in culture, and to the peculiar crystalline substance that caps the granule found in the tissues. The former are supposed to be spores, and are not a characteristic of the anaerobic organism of Wolff and Israel. The latter result from the interaction of the mycelium and the tissue fluid, and are believed to be a protective mechanism of the mycelium. They have been obtained in cultures in special media by Homer Wright. These are the structures which are entitled to be called the "clubs" of an actinomycotic granule. They are a marked feature of bovine lesions, but are very poorly developed in actinomycosis in human beings. Homer Wright attaches considerable diagnostic importance to their presence. They are not, however, a constant feature, though they may be found in a high percentage if a careful examination is made. They have been found in other organisms (e.g., tubercle) after an injection of large quantities of bacilli into the tissues. They are, therefore, neither pathognomonic nor a necessary component of an actinomycotic lesion.

Cases.

The following are the cases I have to record :—

CASE 1.—Female, aged 38, quite well until 1919, when, following on dental extraction under a general anæsthetic, she began to suffer from violent fits of coughing. Three or four months afterwards she coughed up a tooth with a large quantity of fœtid material. After this her attacks of coughing became less violent, occurring chiefly in the morning and after moving from a recumbent position. Her sputum was nummular in form and somewhat fœtid, not of the type ordinarily associated with bronchiectasis. She attended the out-patient department of the Middlesex Hospital for some time, and was admitted to the wards because discomfort was increasing and night sweats were profuse.

Condition on Examination.—She presented a somewhat cachectic appearance, and slight clubbing of the fingers was present. The chest revealed dullness on percussion over a large, somewhat tender area at the left base before coughing, while after any attack of coughing which resulted in the expectoration of a considerable amount of sputum, areas of amphoric breathing and bronchophony were to be found.

Streptococci and diphtheroid bacilli were found in the sputum; an autogenous vaccine was prepared, and a dose of 3 million organisms given. Following on this the temperature rose; there was a great increase in the amount of sputum, which became more purulent and offensive, and as the pain in the chest increased, the vaccine was discontinued. The next day a fluctuating swelling was noticed between the eighth and ninth ribs in the mid-axillary line. A skiagram of the chest showed increased opacity at the root of the left lung, and over the lower lobe of the lung.

The swelling was incised, found to be a small pointing empyema, and drained. A large quantity of yellowish pus containing small yellow granules escaped. Examination of the granules revealed the presence of a branching streptothrix. All attempts to grow it both anaerobically and aerobically failed, so that a complete report cannot be given. After the administration of potassium iodide (about 60 gr. per diem), the sputum gradually reverted to the nummular form, the operation wound slowly closed, and was giving no trouble when the patient left hospital. The temperature gradually settled down to approximately normal, rising intermittently to 99°, and very occasionally to 100° F. The patient was sent to a convalescent home within six weeks, where her general condition improved considerably. There has been no recurrence of the empyema up to the present, the sinus is completely closed, and her condition seems stationary.

CASE 2.—A healthy vigorous male, aged 22, wishing to join the police force, presented himself in May, 1921, for preliminary medical examination. The left lower wisdom tooth was found to be carious; all the remainder were then, and are now, quite perfect. This tooth had never caused him any pain, and no sign of disease apart from the caries was noted in the mouth or elsewhere. He was accepted subject to the removal of the tooth.

The extraction took place on August 3rd, 1921, and was followed by some considerable inflammation which gradually settled down. No further discomfort was experienced until November, when he complained of pain all over the left side of the face. Within a week swelling of the cheek was noted. He was admitted in this condition to the Middlesex Hospital, and was found to be suffering from an abscess in connexion with this part of the lower jaw. The abscess was incised and drained, and the pus from it yielded pneumococcus on cultural examination. Later examination by X rays revealed a very much thickened mandible with several small sequestra.

Sequestrectomy was performed in December, and granules were found in the granulation tissue removed; branching mycelium was demonstrated in the granules. The administration of potassium iodide in large doses was commenced. Several operations have been performed since for the removal of small sequestra. On the last occasion cultural observations were made by Dr. A. N. Kingsbury, who found that the organism began to grow under anaerobic conditions at 37° C. but the culture soon died out.

The condition has made gradual improvement, and there are now two or three scars of healed sinuses in the cheek, while the active area is limited to one sinus leading down to bone, and surrounded by an area of indurated skin of a bluish colour. X rays do not reveal any further sequestrum formation, and the affected area seems to be progressively diminishing.

Clinical Manifestations of Actinomycosis.

The organism invades the tissues through an abrasion, most commonly in a mucous surface, more rarely the skin. The lesion is found generally in connexion with some part of the alimentary tract, usually the mouth or cæcum. Progress of the lesion is at first by local infiltration, and there is a tendency for this to follow fascial planes. Erosion of bones—e.g., the spine—often occurs. The neighbouring glands are involved only by direct spread from the original site. They may, however, be infected by the secondary pyogenic organisms along lymphatic channels. Later the spread occurs by the blood-stream.

The following varieties are usually described :—

Cervico-facial.—Invasion takes place from the mouth through an abrasion of the surface, through a tooth socket in connexion with dental decay, or via the tonsils or salivary ducts.

Thoracic.—This infection may be primary or secondary. Two routes are described in primary cases; invasion through the œsophagus leading to mediastinal infection, or through the bronchi, leading to pulmonary infection. Secondary invasion may occur either by extension from the liver through the diaphragm, or by metastases through the pulmonary circulation. All these forms tend to spread to the surface of the chest.

Abdominal.—A cæcal infection is most common; it usually commences in appendicitis. An infection of the rectum is also met with, but much less frequently. Lesions of the stomach have been reported but are rare. From any of these sources metastatic abscesses may arise in the liver.

Skin.—Actinomycosis of the skin and subcutaneous tissues as distinct from streptothricosis is rare. Quervain gives several cases occurring in the recent war associated with sleeping on straw. Pringle's classical case of peri-anal actinomycosis seems to point to an infection from straw.

Genito-urinary.—The tubes and ovaries have been affected alone, the route of infection being uncertain. The kidney has been reported primarily affected in about eight cases, but few of these have been due to Woolf and Israel's organism.

Other Situations.—Actinomycosis of the brain and of other organs only accessible by the blood-stream has been recorded in cases where no surface lesion has been found, and infection must have been carried through the blood-stream from some point not ascertained.

I do not propose to attempt to record the clinical course of the various forms. Excellent clinical accounts have been given in France by Poncet, and in England by Kellock and by Cope, both the latter leaning towards the theory of Bostroem, as indeed do most clinicians. Kellock, however, in attempting to account for the various social and occupational conditions of the persons affected, states "that one is compelled to conclude either that the infection has been much more widely spread than was formerly supposed, or else that the organism that is its cause has, like other forms of life, undergone a process of evolution, and changed its locality and habits."

Evidence Favouring Bostroem's Theory.

Finally, the arguments brought forward by the supporters of the two schools can be considered. The arguments in favour of Bostroem's supposition have been ably marshalled by Mattson, and may be presented as follows:—

(1) *Evidence from Cases in Animals.*—After recording the observations of Conn on the preponderance of actinomycosis in the flora of sod-soil, Mattson cites Jensen's record of actinomycosis in endemic form in cattle, especially in marshy districts and in lands reclaimed from the sea. He also recalls the historic observations of Bostroem, who found the remains of grain or its sheath in several of his cases, and of Johne who, whenever he noted barley sticking in the tonsils of pigs, found them covered with a fungus similar to, if not identical with, the ray fungus.

(2) *Evidence of Cases in Man.*—It is usually stated that the disease is more common in those whose occupation entails the handling of hay or straw. Hummel collected 13 cases in German literature of infection associated with a foreign body, usually a piece of barley corn. Soltmann reports a case in a boy of 11, the sequel of swallowing an ear of barley. A thoracic abscess developed which on incision was found to contain an ear of barley and actinomycotic granules. Cope records a case in a boy of 10, who swallowed a blade of grass which lodged in the right tonsil. An actinomycotic abscess developed behind the angle of the jaw, and through the sinus resulting from it a piece of grass was eventually discharged. Mattson himself adds a case of cæcal actinomycosis; further examination of a previously removed appendix revealed a concretion round a grain of wheat, but he does not record the presence of infection in the appendix round the grain. To the above cases may be added those of Quervain and that of Pringle, both mentioned above.

The evidence here is merely circumstantial, and it may be equally well argued that if the organism is already present in the mouth, the damage done by bits of straw which are yielding enough to escape the efforts of the tongue to remove them, is yet sufficient to permit the invasion of the organisms present. Moreover, if chronic sinuses are present in the mouth, it can easily be imagined that bits of straw would tend to lodge in them in the case of herbivorous animals such as cattle.

Evidence Favouring the Theory of Wolff and Israel.

In support of the alternative theory are the following facts and arguments:—

(1) The organism of Wolff and Israel, which has been shown to be the commonest organism isolated from clinically typical cases of actinomycosis, is anaerobic and grows only at body heat. It is difficult, therefore, to understand the connexion between this streptothrix and those found on grasses. As noted above, Wright thinks that even the organisms that Bostroem isolated from the cases he reported were either cultural contaminations or secondary infections of the lesion.

(2) Branching streptothrices exist in the mouth, especially in connexion with decayed teeth, and similar organisms have been found throughout the alimentary canal, least frequently in the acid-secreting stomach. The more easily grown aerobic forms have been isolated and described. It must be remembered, however, that the floral conditions existing in dental cavities and elsewhere throughout the alimentary tract render these situations unpromising sources from which to grow such a delicate organism as the actinomyces of Wolff and Israel.

(3) Lord injected the contents of teeth and tonsil crypts into guinea-pigs, and obtained club-shaped structures round branching mycelium. The objection to the conclusiveness of this experiment is that he did not isolate the organism from the material injected or from the resulting lesion in the guinea-pig.

(4) Clinical evidence of the dental origin of the lesion is not lacking: (*a*) A case recorded by Cope is of interest: The patient contracted actinomycosis as a result of an injury to his knuckles, sustained while knocking out an opponent's tooth; the opponent apparently had no actinomycotic focus. A similar case is recorded in America by McWilliams. (*b*) Cope also records a large central abscess expanding the lower jaw in direct connexion with the socket of a carious stump. The second case reported above, where the lesion followed the extraction of a carious tooth, is also significant. (*c*) Stengel records a case in which actinomycosis followed injury to the cheek by an instrument used in extracting a tooth. (*d*) The case of thoracic actinomycosis (Case 1) reported above also provides equally good circumstantial evidence. A case of thoracic actinomycosis is reported by Israel, in which he found the remains of a tooth in the bronchus. I believe other similar cases have been published, but I have been unable to trace them in the literature.

The main argument advanced by Mattson against this second theory is that actinomycosis never follows on surgical interference in the abdomen or mouth. This argument cannot be accepted lightly; Mattson himself records a case, previously mentioned, in which actinomycosis followed appendicectomy, performed apparently for acute appendicitis, and such cases are not uncommon. It is not often that actinomycosis is suspected at the time of operation for an acute attack of appendicitis. That diagnosis is prompted by the subsequent history. It is quite conceivable that the appendicectomy itself may have been the final cause determining the onset of actinomycosis in a certain number of cases of this type, and the course of events may then be compared to that shown in Case 2 recorded above. In this case it would be difficult to convince oneself that the extraction did not determine the onset of failure of resistance of the tissues.

When the onset has been less sudden and operation is delayed the disease may be found at operation to be definite and established. The course of such cases may be compared to that quoted above (recorded by Cope) of a central abscess of the jaw. It may also be noted here that cases of accidental infection from the gut by *Streptothrix eppingeri* following operative interference are reported by MacCullum and Foulerton;

Factors Determining Invasion.

It has been found by investigators to be very difficult to transmit the lesion of actinomycosis to animals. The general belief is that certain conditions must be present to enable the parasite to gain a hold in the new surroundings. These include such factors as the presence of a foreign body—e.g., straw in the fauces, or of other organisms. The well-recognised onset of actinomycosis after an acute attack of appendicitis is a clinical illustration of the effect of the latter, but a more definite relationship to certain bacteria is also proved by the discovery of bacillary organisms embodied in the granule of which they form the felt. Thus Wolff and Israel described Gram-positive micrococci; Klinger, the presence of Gram-negative cocco-bacilli, *B. actinomyces comitans* (confirmed by Colebrook). Inoculations from pure culture are not successful in producing progressive lesions in small animals, and recent experiments in the direction of determining the necessary combinations of mixed infections have given rather negative results so far.

In conclusion, it appears that most of the direct evidence supports the theory so strongly advocated by Homer Wright. Clinical evidence can at best only be regarded as circumstantial and may be used in support of either theory. The final solution of the problem, therefore, must be sought in the laboratory by cultural and inoculation investigations.

I am indebted to Dr. W. Essex Wynter for permission to publish Case 1, and to the late Mr. T. H. Kellock for permission to publish Case 2.

References.

Lebert: Atlas d'anatomie pathologique, 1857.
Aciand, T. D.: THE LANCET, 1886, i., 973; Brit. Med. Jour., 1886, i., 1159.
Poncet et Berard: L'actinomycose humaine, Paris, 1898 (and literature).
Homer Wright: The Biology of the Micro-organism of Actinomycosis, Journal of Med. Res., 1904 (with literature).
Chalmers and Christopher: Sudanese Actinomycosis, Annals of Trop. Med. and Parasit., 1916, vol. x.
Colebrook: Journal of Exp. Path., 1920, vol. i., No. 4; THE LANCET, 1921, i., 893 (with literature).
Leyton, A. S. and H. G.: Journal of Path. and Bact., vol. xxi., No. 1; vol. xxiii., No. 3.
Mattson: Surg., Gyn., and Obst., xxxiv., 482 (with literature).
Partsch: Die Eingangspforte des Aktinomyces, Wien. klin. Woch., 1893, vi., 97.
Cope: Brit. Jour. of Surg., 1915, iii., 55.
Stengel: New York Med. Record, 1910, lxvii., 954.
Kellock: Trans. Med. Soc. Lond., 1906; Trans. Odont. Soc., 1904; Trans. Roy. Soc. Med. (Surg. Sect.), 1913.
McWilliams: Annals of Surg., 1917, lxvi., 117.
Medical Science, Actinomycosis, vol. iii., No. 3.
Pringle: Proc. Roy. Med. (Dermat. Sect.), 1919, xii., 12.

NOTES ON A LIMITED OUTBREAK OF ACUTE GOITRE IN A CHILDREN'S HOME.

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IN this paper we propose briefly to summarise the salient characteristics of a curious outbreak of acute goitre which ran its course during the earlier months of this year and was limited in incidence to one cottage out of a colony of nine occupied dwellings which constitute with one other cottage, unoccupied at the time, the Children's Cottage Homes in connexion with the Birch Hill Poor-law Institution. These Homes are situate near the village of Wardle and are about four miles distant from Rochdale. Epidemics of acute goitre of greater or less extent have been previously described (McCarrison, Guillaume, Simon, &c.), but appear to be of sufficient rarity still to merit record. Moreover, the causation of such epidemics is, as yet, obscure, and though in the present instance it has only been possible to arrive at certain tentative conclusions, we think that an account of the clinical features of the epidemic ought to be placed on record both in the hope of eliciting the experience of others who may have encountered similar outbreaks and of assisting future observers.

Though the chronic form of goitre seems to be rife among the children of all the cottages (ages 3–15 and of both sexes), the sole brunt of the acute epidemic was borne by cottage No. 3. The inmates of this cottage at the date of the epidemic numbered eight—boys of ages between 4 and 10 years, and all these children were affected. The adult staff of this cottage, consisting of a foster-mother and her husband (resident) and a female cleaner (non-resident) escaped.

There is, unfortunately, no record of the previous thyroid state of these boys, though it is known that one of them, on admission to the cottage some months before, had been observed to possess a distinctly visible thyroid, and it is probable, judging from the results of an examination of the children in the remaining cottages, that another case or two of slight chronic enlargement might have been detected had there been occasion especially to look for it before the commencement of the acute outbreak. However this may be, the course of events is sufficiently striking, as is evidenced by the fact that no other cottage of this colony has, during the period of tenure of the present medical officer (H. N. C.), ever experienced the dramatic thyroid flare-up which was the lot of cottage No. 3.

Outbreak of the Epidemic.

The course and clinical symptoms of the epidemic were as follows: On Jan. 7th, 1923, the boys of No. 3 cottage were inspected during the course of the ordinary routine examination by the medical officer (H. N. C.). Though the examination was not specially directed to any one region, nothing in the appearance of the boys served to draw attention to their thyroids, and no enlargements were noticed save in the case of the boy above mentioned. On Jan. 10th, S. U., aged 9, the boy who had already been noted as slightly goitrous, was seen by the foster-mother to have a very marked goitrous swelling far in excess of the boy's normal fullness in the region of the throat. On the 12th two other boys, T. A., aged 9, and L. G., aged 8, were also noticed to have large thyroid swellings. On the 13th all the remaining five boys presented thyroid swellings, distinct in all, though varying in degree individually. In all the cases the swelling was soft, elastic, painless, and non-inflammatory. The right lobe was invariably more affected than the left, and there were no glandular enlargements elsewhere. In some of the cases there were carotid thrills and enlarged venules over the gland and upper sternum which disappeared later. In no case, however, was there any thrill over the gland itself, nor were any of the signs of hyperthyroidism present. The thrills and congested venules noted were, therefore, probably merely mechanical effects. The pulse was variable, but allowing for age and the psychological effects of the examinations the rate of the pulse seemed in no case to have any special significance. The temperature was normal and remained so always. The general health of the boys was unimpaired. The picture was that of a symptomless acute enlargement of the thyroid gland.

Systematic physical examination of the boys revealed nothing further, save that carious teeth were present in two of them, and some faucial congestion was noticed in five of the eight boys. The bacteriological reports on these throats were negative as regards diphtheria and diphtheroid bacilli, but gave the predominating organisms as streptococci. The lad S. U. (the first case noticed) is a mental deficient. The youngest boy (aged 4) is a sickly-looking lad, but has no definite disease.

Course of the Epidemic.

Such, then, was the state of affairs at the commencement. The further course of the epidemic will now briefly be summarised. The maximum thyroid enlargement appeared to be rapidly attained in a few days, and after a period varying between five to seven days, the thyroids began to subside, so that by the seventh day appreciable diminution was noticeable in all the cases. This subsidence continued, though not without fluctuations, for about a fortnight, after which a stationary period occurred, during which it was difficult to detect, either by measurement or otherwise, any appreciable change. By Feb. 1st, however, one of the cases, at least, was considered to have returned to normal. After this date progress, though slow, was more readily appreciable, and by March 6th the thyroids in three of the boys would not have attracted attention, while in four of the others the thyroid enlargements could only have been described as "slight." In only one boy of the eight would the condition of the thyroid at once have arrested the attention of an observer at the first glance. During the period Feb. 1st to March 6th a diminution of as much as 2 inches in the neck circumference was observed in the boy S. U., while in another boy a subsidence of 1 inch was recorded. The remaining cases showed decreases varying from half to three-quarters of an inch.

Slow but sure progress continued to be made, and by April 8th there was room for difference of opinion as to whether the thyroids could now be considered

to be enlarged in five of the boys; in two the goitre was classified as slight, and the boy S. U. showed a further diminution in neck circumference of half an inch (making 2½ inches in all since Feb. 1st). His was the only case at that date where the enlargement was at all obvious, but it was considered probable by the observer (H. N. C.), who was in a position to compare his state before and after the epidemic, that he had returned to his former condition. The last joint examination of the cases was made by us on May 22nd. The condition as regards the thyroid swellings, save in the case of S. U., was not appreciably different from that described on April 8th—that is to say, in two of the boys there was still slight goitre and in five the thyroids might be described as normal.

We think that the thyroid state of the inmates of No. 3 cottage does not now materially differ from that existing in many of the other cottages where no acute epidemic has occurred, and where a similar proportion of cases of slight goitre has been detected. We therefore suppose ourselves justified in assuming that the acute epidemic in this cottage may be considered to have come to an end, and that the residuum may be regarded as the state which would probably have been found had attention been specially directed to the thyroids in the children of this cottage prior to the occurrence of the epidemic.

As regards the boy S. U., the thyroid was slightly larger than at the examination on April 8th. These fluctuations in chronic goitre are not uncommon. (The goitre in this boy, however, subsequently rapidly returned to the condition described on April 8th, and has remained in that state up to date —August 16th. No change in respect of the other children has occurred since the last note.—H. N. C.)

Ætiology.

As we have no desire unduly to prolong this paper, which is written mainly with the object of putting on record the physical characteristics and clinical course of the epidemic, the results of some rather laborious inquiry to ascertain the cause of the outbreak will only be stated baldly and briefly. This is the easier done since, unfortunately, the results of such inquiry are mainly negative.

There is nothing notable in the previous health of the boys of this cottage, except that there had been a slight epidemic of measles among them which occurred in the early part of December, 1922. Three of the boys suffered, but all had completely recovered by the date of the goitrous outbreak. There had been no cases of mumps, scarlet fever, diphtheria, or other infection on tracing the records back for several months. The faucial congestion found in five of the boys at the early examinations has already been noted. Besides what may be termed the permanent population of this cottage, a certain number of children pass through it on probation before allotment to other cottages, thus constituting a sort of floating population. Two children so passed through near the date of the epidemic—viz., a girl, E. L., aged 13, and her brother J. L., aged 10, who were admitted on Dec. 30th, 1922, and stayed seven days, leaving on Jan. 6th—i.e., four days before the first case of acute goitre was detected. E. L. was found to have a slight goitre, which, however, had been present some time and was probably due to physiological causes. J. L. was goitre-free. The adult staff were found healthy, the only illness recorded recently being a slight attack of influenza, from which both the foster-mother and her husband suffered. Among the inmates of the other cottages, recent illnesses included one case of measles in each of two cottages, one case of scarlet fever which was promptly sent away and gave rise to no further cases, and some trivial and ephemeral complaints of no import. The children of the various cottages come into contact at play, on the way to school, and so on.

As regards the immediate neighbourhood, goitre is endemic in the district, according to the view of Dr. D. McGill (medical officer of health, Wardle), but there is no consensus of opinion that the goitre incidence is really higher in any part of Lancashire than in most other districts. Inquiries made in the schools of the area showed, however, that goitre, usually of a slight or moderate degree, was not uncommon among the children. In these inquiries we received very valuable assistance from Dr. J. J. Butterworth (M.O.H. and School M.O., Lancs County Council, &c.) and from Dr. W. M. Ash (Assistant County M.O., Lancs, and School Med. Insp., Lancs), who examined the thyroid states of 249 school children attending schools in the neighbourhood and compared the results with those found in 83 of the cottage children who comprise the population of the cottages other than cottage No. 3. Dr. Ash's figures show 33 cases of thyroid enlargement of varying degree among the 83 cottage children as compared with a total of 30 cases among the 249 school children. These are significant figures, and at least show that there is some abnormality in what we may call the thyroid soil of the cottage children generally. It is of some interest to compare these figures with those obtained by Dr. C. N. Atlee in an investigation into the prevalence of goitre among children under 12 years of age in the South-Eastern quarter of London. Seventy-seven cases were found among the 1839 children examined.[1] No other cases of acute goitre were, however, encountered, with one doubtful exception.

As regards other illnesses, measles seems to have been the only prevalent affection recently among the children of the surrounding neighbourhoods. The state of affairs, therefore, seems to be that though there is a case for inquiry whether goitre is or is not unduly prevalent in the area around Rochdale, there is no doubt that a high degree of thyroid instability is present among the children of these Homes generally, and that some special factor (or combination of factors) has acted as a detonator to explode this unstable material in cottage No. 3.

We feel justified in saying little more than this at present. Neither the general cause of the endocrine instability nor the special factor which produced the explosion in a particular cottage emerges at all clearly. On the general point it may be said that the cottage buildings, though sound and comfortable, are not, perhaps planned to give the maximum amount of light and ventilation, and it is possible that experience may show that some revision of the diet and régime may be advantageous. But chemical and bacteriological examinations of the water and milk have so far afforded no real clues, nor have other inquiries which cannot be detailed here.

We are just as much in the dark as to the nature of the spark which ignited the material in one special cottage. So far as possible all the contacts of the cases have been traced and examined, but no definite results emerge. The conditions of life in all the cottages are the same. The water-supply and milk-supply are the same for all. The dietary is the same; the food is obtained from the same sources of supply. The sewage disposal is on one plan. The cubic space and floor space per boy in the No. 3 dormitories do not materially differ from those for the children in the other cottages. Careful measurements have been made in all these respects and these are the general results. The inmates of the affected cottage appear to get as much light, air, and exercise as the inhabitants of the other cottages, and the past general health of the boys of this cottage appears to have been at least equal to that of the children of the remaining ones, with the exception of the measles epidemic. But though only three of the eight children in cottage No. 3 had measles, this fact, coupled with the condition of the fauces in the majority, may have some significance, and may possibly mean that the special factor must be looked for in some form of infection. This appears to be all that can usefully be said at the present moment in the matter of the ætiology, though we are not without hope that some more definite statement may be possible at a future date as the result of continued observations.

[1] See Annual Report of L.C.C. for 1922, pp. 55–56.

THE CAUSES OF HEADACHE.*

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HEADACHE may be associated with almost any form of illness; it may be so trivial and so persistent as in time to be regarded almost as normal; it may be so severe as to make life nearly intolerable; and there is hardly a symptom so common and at the same time so little understood. It presents no outward and visible signs. Our knowledge of its character must depend almost entirely on the patient's statements, and in a large number of cases we can only conjecture what is the actual process which causes the pain. But without some such conjecture, without some sort of mental picture of the origin of the symptom, its treatment can be little more than empirical and haphazard.

The classification of headache in most works of reference is, to my mind, entirely unsatisfactory. It consists in most cases of a partially classified list of conditions with which headache is associated, and nothing more. It gives no hint of how the headache is caused. For instance, "headache due to toxic causes" may be a useful pigeon-hole, but it conveys no very clear idea. I suggest a different classification, dividing headache into three main groups, as follows: 1. *Intracranial*, due to actual processes occurring within the cranial cavity. 2. *Cranial*, due to processes affecting the cranial walls and the air spaces contained within them. 3. *Extracranial*, due to processes affecting structures outside the cranial walls. By "process" is meant the actual organic condition directly responsible for the head-pain. Thus, in an intracranial headache (Group 1) the pain arises as a result of some intracranial change. This intracranial change may itself be due to some extracranial and more general condition, but the headache is only "extracranial" if the actual pain-causing lesion is outside the skull. These groups, in fact, refer to the starting-point of the pain, and not to the condition with which that pain is associated.

Intracranial Headache.

The intracranial group has two main subdivisions: (*a*) cortical, and (*b*) dural.

(*a*) *Cortical.*—This subdivision includes all headaches arising in the cortex. Almost all these may be classed as purely functional. They are due to exaggerated activity of that part of the cortex concerned with the sensation of the headache area. This form of headache may be the product of a perverted mental process without any organic lesion, and is usually associated with other symptoms of a hysterical nature. True migraine is also probably of cortical origin, the exciting cause being unilateral. Headache due to organic changes in the cortex *and arising* in the cortex must be rare. The cortex itself is quite insensitive, and the only organic process capable of producing a cortical headache must be one which stimulates exclusively the pain-perception cells connected to the painful area.

(*b*) *Dural.*—This subdivision probably accounts for the majority of headaches. Headache of this class is due to irritation of the nerve-endings in the dura mater. The cortex and cerebral tissues themselves have frequently been demonstrated to be quite insensitive; the inner lining of the skull, on the other hand, is well supplied by branches of the trigeminal and other cranial nerves, and in certain areas pacinian corpuscles are present. Moreover, the dura is homologous to periosteum, which is known to be pain-sensitive. The headache originates in the dura, the nerve-endings of which are irritated by pressure or inflammation. Anything which raises the intracranial pressure may thus produce a headache: (1) Cerebral hyperæmia and cerebral œdema account for such headache as accompanies acute fevers, asphyxia, renal disease, toxæmias whether bacterial or otherwise, and many head injuries; (2) increase of cerebro-spinal fluid; (3) mass increase of cranial contents, by tumour, abscess, gumma, extravasated blood, &c. Any of these may produce pain by pressure on the dura in the absence of any inflammatory irritation of it. In a similar way, headache may result from inflammation of the dura acting alone, whether localised or general, acute or chronic. But the dural nerves appear to be far more susceptible to pressure than to inflammation. The intense headache of cerebro-spinal fever is immediately relieved by lumbar puncture, though in many cases the dura remains all the time in an acutely inflamed state. Headache of this type may arise in other conditions where these two factors, pressure and inflammation, are combined—whenever, in fact, pachymeningitis carries with it a high intracranial pressure. The importance of raised intracranial pressure as a cause of headache has been proved frequently. The severe headache of pituitary tumour is relieved by decompression, that of meningitis by lumbar puncture. Reports on head injuries during the war showed headache to be more severe in, and more particularly associated with, those cases in which the skull was intact, while cases of much more extensive trauma with exposure of the cranial contents were relatively free from headache.

Little is known about the regulation of intracranial pressure, as regards either blood-supply or production and absorption of cerebro-spinal fluid. It is reasonable to suppose that headache associated with a high systemic blood pressure, such as that of chronic nephritis, may be relieved as a result of lowering the blood pressure. At the same time it is quite as possible that the cerebral congestion is due to the action of toxins of intestinal or other origin, and that depletion cures the headache by removal of the toxin. Headaches of this type—high-pressure headaches, in which there is no intracranial inflammation—tend to be dull, and are increased on lying down; they are relieved by anything which lowers the pressure; if intermittent they do not tend to recur constantly in the same place; they are not accurately localised.

I think it possible that in the great majority of cases in which headache occurs as one of several symptoms, as part of a recognised syndrome, or as one feature great or small in some general condition, the headache is of this type—that is to say, it is due to irritation of the dural nerve-endings from increase of intracranial pressure, general or partial, transient or progressive. The headache which occasionally follows lumbar puncture appears after this a paradox; but, unlike most forms, it is relieved by lying down and made worse on sitting up. It is almost certainly due to pressure of the brain on the tentorium and basal dura owing to lack of the supporting fluid cushion. One form of headache met with in anæmia resembles this; it is possibly due to a diminished secretion of cerebro-spinal fluid.

It will be obvious in the light of clinical experience that the pressure explanation of headache is inadequate. There are unknown factors which determine the relation between the severity of the headache and the degree and direction of the pressure. Time is one of these factors. An increase of cranial contents arising slowly, as in cerebral tumour, may reach a higher level before headache is produced, as the tissues have time to adapt themselves. In the case of the rapid increase from active or passive congestion headache is likely to arise sooner, the inelastic walls of the cerebro-spinal system having had no time to stretch. It is also probable that some areas of dura are more sensitive to pressure than others.

Cranial Headaches.

The cranial group includes headaches due to disease of the cranial walls, and may be classified in two main subdivisions: (*a*) disease of the cranial bones, and (*b*) affections of the nasal sinuses.

(*a*) Chronic osteitis of the skull, such as occurs in the common extensions of middle-ear suppuration, is not often associated with headache. Indeed, in chronic

* A paper read before the Harrogate Medical Society.

otitis media, headache, other than the frontal "intracranial" type which may be associated with any septic absorption, should be regarded as a danger signal. It is almost always due to the disease reaching the dura with the production of an extradural abscess. Such a headache is not usually very severe; it tends to continue, showing little variation, and is fixed to a definite place, over which there is usually tenderness to deep pressure and percussion.

(*b*) The nasal sinuses are a much more prolific source of headache; the very intimate relations of the frontal, ethmoid, and sphenoid sinuses to the interior of the skull, and the fact that all these cavities are in communication with the nasal passages, are open to the same infections, and are lined by a sensitive mucous membrane, make it surprising that headache is not more universal. Headache arising from a nasal sinus is due, in almost all cases, to inflammation of the lining and pressure. The latter is, again, as in "intracranial" headache, the important factor. It is *retention* of secretion which causes the pain. For this reason the headache bears no direct relation to the severity of the infection or inflammatory process. A mild catarrhal sinusitis producing clear mucus may cause a severe headache, while a profusely suppurating sinusitis with destruction of the mucous lining may be painless. The determining factor is the efficiency of the outlet. This applies to *chronic* sinusitis; it is probable that no acute sinusitis is painless.

The openings of the nasal sinuses are small. This fact accounts for the relative infrequency with which infections of the nose reach the sinuses; but, at the same time, it has the result that a small amount of swelling is sufficient to close the opening and cause retention. Several of these ostia, again, are situated in a part of the nose so narrow that a very slight degree of deformity will prevent efficient ventilation and favour an inflammatory process around the opening, which is already at a disadvantage. This is particularly the case with the frontal sinus, of which the narrow tubular opening lies under cover of the middle turbinate. If the latter is swollen, hypertrophied, or pressed outwards by a deviated septum, the opening may become closed. Such a closure may cause headache without any true infective sinusitis. The air in the sinus becomes absorbed and a partial vacuum results. This gives rise to congestion of the lining with frontal headache and tenderness; the condition has been described by Sluder as "vacuum frontal headache." A headache of this type is supraorbital, usually unilateral, worse in the morning, and increased by close work with the eyes; the last symptom is due to the pull of the superior oblique muscle on the trochlea which is attached to the thinnest part of the floor of the tender sinus. The ethmoid and sphenoid sinuses communicate with the nasal cavities through comparatively simple though small orifices, and not by a tubular or grooved opening like that of the frontal sinus. This simpler type of opening, from its smallness, can easily become blocked by inflammatory swelling of its edges, but is not affected by lateral pressure, such as results from nasal deformities and causes closure of the frontal sinus. The latter is susceptible to both forms of attack, and this is one of the important factors which make a frontal headache the commonest clinical variety.

Nasal sinus headache has certain characteristics. It is frequently the only symptom, the patient being otherwise in good health. In acute sinusitis it may be neuralgic in character or intense and throbbing. In more chronic cases it may take any form, including that of a sense of uncomfortable pressure from without. It tends to be localised to one area, and, if recurrent, the same area is affected each time. Anything which increases the congestion of the lining immediately increases the headache. Thus the patient may have discovered by experience that stooping to pick anything up is accompanied by the most acute pain. The same applies to coughing, and, to a certain extent, to jarring movements. Periodicity is a very marked feature. The pain is usually worse in the morning. In connexion with this fact it must be remembered that the frontal and sphenoidal sinuses drain by gravity in the erect position only, and consequently tend to fill up during the night. This morning pain is so definite and punctual a feature that it has been called "sun-pain," from a mistaken idea that the heat of the sun was the cause; cases have actually been diagnosed as malaria from the regular recurrence of the headache. There is a general tendency for the pain to come on suddenly, to reach its maximum rapidly, and, after a variable period, to vanish with equal suddenness.

As regards position, a sinus headache is usually unilateral—the opposite to "intracranial" headache. In the case of the frontal sinus it is referred to the supraorbital region, and is associated with local tenderness, especially of the floor under the inner third of the supraorbital margin. With the deeper sinuses, ethmoidal and sphenoidal, localisation is by no means so definite. Sphenoidal pain is referred to the temporal regions, the occiput, or the vertex. In the last position the "heavy weight" sensation is not uncommon; a fact which must be remembered before a diagnosis of *clavus hystericus* is made. Pain arising in the ethmoid may be referred to the back of the eye or the region of the inner canthus. Some of these features occur, of course, in headaches of intracranial origin. They are not in themselves definite evidence of sinus mischief; nor are they by any means essential to a case of sinusitis.

The following points, in a case of headache, should arouse a suspicion of the pain being due to sinusitis:—(1) If the headache is unilateral, and especially frontal; if it shows a marked periodicity; is worse in the morning; has a sudden onset; always recurs in the same place; and is immediately greatly increased on stooping, then a sinus should be suspected. (2) If, in addition, there is a history of "catarrh"; if the nasal airway is defective on either side (and patients may be quite unaware of this); and if the patient is otherwise in good health, sinusitis is still more likely. (3) Finally, if the headache is relieved by inhalations of steam, medicated or not, it can be definitely concluded that its source is in the nose.

There is, in addition, a type of headache due to what I should like to call the "excitable nasal sinus." Such a sinus is one which, under ordinary conditions, gives rise to no trouble, but which, owing to structural variations or to a slumbering sinusitis, "flares up," as it were, on the slightest pretext. Many cases of menstrual headache which are frontal and unilateral are undoubtedly of this type. The same condition is also probably at the bottom of many similar headaches which come on with fatigue, constipation, toxæmia, and other systemic conditions.

Extracranial Headache.

The third main group, the extracranial, includes those cases in which, as I imagine it, during the course of the headache the cranial contents and cranial walls are in a perfectly normal condition. The following types of "extracranial" headache may be briefly considered:—

Ocular Type.—These headaches are due to fatigue of intra- and extra-ocular muscles, generally from errors of refraction; from increased intra-ocular tension, inflammation, and other causes. They are usually worse in the evenings, the opposite to nasal headache. The pain is referred along branches of the trigeminal nerve, usually to the frontal and temporal regions; but it may be occipital.

Dental Type.—These are referred headaches of dental origin. In the majority of cases referred dental pain, as distinct from actual toothache, is found over face areas, but the upper incisors may give rise to frontal headache.

Nasal Type.—Pressure of the middle turbinate against the septum has been advanced as a cause of homolateral frontal headache, but it is common to find the middle turbinate in close contact with the septum, and a total absence of headache. I think it much more probable, in the light of Sluder's work on the vacuum frontal sinus headache, that the pressure of

the turbinate against the septum is not the important factor in producing the pain, but that such a state of things is keeping up one of the forms of frontal sinusitis.

Ganglionic Type.—The sphenopalatine ganglion (Meckel's ganglion) lies, covered only by the nasal mucous membrane and a little areolar tissue, just behind the middle turbinate. It has intimate connexions with the fifth and seventh cranial nerves and the sympathetic, is more superficial than any other ganglion in the body, and is exposed to nasal infections. If this ganglion become inflamed it gives rise to the sphenopalatine syndrome, one symptom of which is headache of the very characteristic type described by Sluder as follows:—

"A coryza of variable severity, followed in a short time by pain at the root of the nose, in and about the eye, upper jaw and teeth, extending back to the temple, about the zygoma to the ear, causing earache, emphasised at the mastoid, but always severest at a point 5 cm. behind this; thence back to the occiput and neck; it may extend to the scapula and shoulder, and in severe attacks to the arm, forearm, hand, and even finger-tips."

Half a minim of saturated cocaine solution applied over the ganglion stops all the symptoms immediately.

The Author's Schema.

Every headache, then, falls into one of these three main groups, and I suggest that this classification may lead to a clearer comprehension of the symptom.

1. *Intracranial.*

A. CORTICAL.—*Headache arising in the sensory cortex.*
(1) *Functional*—e.g., hysteria; neurasthenia; migraine (hemicrania).
? (2) *Organic.*—? Disseminated sclerosis.

B. DURAL.—*Headache due to irritation of nerves of dura mater.*
(1) *Intracranial Pressure*—
(*a*) *Raised* by:—
(i.) Hyperæmia.
(α) Active—e.g., head injury; fevers; nephritis; bacterial toxæmias; fatigue; reaction after syncope; meningitis; constipation; menstrual and uterine poisons (lead, alcohol, &c.), anæmia.
(β) Passive—e.g., asphyxia; morbus cordis.
(ii.) Cerebral Œdema.—Head injury; sunstroke.
(iii.) Increase of Cer.-spin. Fluid.—Hydrocephalus; meningitis; head injury.
(iv.) Increase of Cranial Contents.—Tumour; cyst; gumma; abscess; extravasated blood.
(*b*) *Lowered* by deficiency of C.-S. fluid; *headache due to pressure of unsupported brain on basal dura and tentorium.*
(i.) Leakage.—Lumbar puncture.
(ii.) Hyposecretion.—Anæmia.
(2) *Inflammation.*—Pachymeningitis—localised suppurative meningitis; subdural abscess; G.P.I.

2. *Cranial.*

A. BONE DISEASE.—*Headache due to irritation of periosteal or dural nerves.*
Osteitis., *Periostitis.*, *Extradural Abscess.* } —e.g., infected fractures; extensions of otitis media; syphilitic necrosis.

B. NASAL SINUSES.—*Headache due to irritation of nerves in mucosa lining.*
Sinusitis and Retention.—Headache without other symptoms or with nasal catarrh or obstruction.
"*Excitable*" *Sinus.*—Constipation; toxæmias; menstrual.
N.B.—Pain arising in the middle ear and mastoid is not included under "headache."

3. *Extracranial.*

Headache due to irritation of nerves or nerve-endings outside the cranial wall, and referred.
(1) *Ocular.*—Muscular fatigue—Errors of refraction.
Hypertension—Glaucoma.
Inflammatory—Iritis.
(2) *Dental.*—Fronto-nasal headache referred from upper incisors—Dental caries.
(3) *Nasal.*—Pressure on septum—Headache with nasal obstruction.
Meckel's ganglion inflammation—"Sphenopalatine syndrome."
(4) *Neuralgic.*—Irritation of branches of fifth or other scalp nerves—Trigeminal neuralgia; cervical caries (occipital).
(5) "*Rheumatic.*"—Inflammation of muscle or aponeurosis of occipito-frontalis — Myositis; "muscular rheumatism."

Headache of extracranial origin may be part of a trigeminal neuralgia when this is due to some irritant acting on the fifth nerve outside the skull, or may accompany any process which causes a neuritis of the scalp nerves. Pain of this sort differs from most other forms of headache in being sharp and radiating. It is accompanied by a superficial tenderness along the course of the affected nerves.

Summary.

To recapitulate, these three main groups based on anatomy correspond with three main clinical varieties typified in the following three examples:—

In supraorbital neuralgia (Group 3, extracranial) the patient complains of a pain which shoots upward into the forehead, and the maximum tenderness will be found over the nerve. Pressure near the supraorbital notch will increase the severity and area of the pain.

In supraorbital frontal sinus headache (Group 2, cranial) the pain is fixed, dull, and may be throbbing; the maximum tenderness is usually on the floor of the sinus under the inner third of the supraorbital margin. Superficial tenderness is not so marked, and pressure over the supraorbital notch has no definite effect.

In supraorbital headache of intracranial origin (Group 1) there is no tenderness, though there may be hyperæsthesia to finer skin tests.

That is what I believe to be the "anatomy of headache." It does not rest on definitely proved facts, but it is put forward as a useful working hypothesis.

THE TREATMENT OF SCARLET FEVER BY EUCALYPTUS OIL AND CARBOLIC OIL VERSUS ISOLATION.

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MY experience of scarlet fever extends over two periods: from 1910–11 as resident medical officer at Her Majesty's Hospital, Dr. Barnardo's Homes, then under the supervision of the late Dr. Robert Milne; and from July, 1920, up to the time of writing, as one of the medical officers of the Homes. During the former period the treatment of the disease by inunction of the skin with eucalyptus oil and by the application of 10 per cent. carbolic oil to the tonsils and pharynx was accepted without question. The number of cases then seen was less than six. During the past three years, as a result of experience of over 280 cases, I have been led to reject this method. This finding has been for me a most unpleasant one, because it brought me into opposition to a mode of treatment instituted by an honoured personal friend; for several months before his lamented death we had been in communication upon the subject, and I had hoped that at the close of one year's treatment by isolation a joint pronouncement could have been made. I should now prefer not to enter upon a discussion of such a nature, but am impelled by the following considerations. I have been repeatedly asked by medical officers of health and others for an opinion on the treatment; the three years' records in my hands contain facts of vital public interest; the method which has failed in my practice is still being used by others, as at Tottenham and Heston,[1] and only by the collation of records of cases and epidemics can truth be elucidated. The late Dr. Milne[2] has written: "Of course, if the new mode of treatment proposed will not stand the severest tests, the sooner its failure is declared the better." At a meeting of the Epidemiological Section of the Royal Society of Medicine the chairman read a note from Dr. John C. Thresh[3] expressing his opinion: "The enormous pecuniary and other advantages which would accrue to the community if Dr. Milne's claims were substantiated, as he believed they could be, led him to hope that some means might be devised whereby the treatment could be tested under conditions which would render the results conclusive." Such statements as the above have encouraged me to investigate the treatment. The results here recorded have convinced me that the claims made cannot be sustained, and have led me to agree with the criticisms of Dr. E. W. Goodall,[4] one of which is that it has

not been shown that the eucalyptus treatment has anything to do with the loss of infectiousness.

During the past 50 years the virulence of scarlet fever has steadily declined, as evidenced by the drop in fatality from about 700 per million of living persons in 1871 to 40 per million in 1921. During this period great advances have been made in public health and hygiene which have a bearing upon rates of mortality. Any imagined benefit seeming to accrue from a specific treatment of the disease during this period may be accredited to the treatment without recognising the fact of diminished morbidity. In my opinion the supporters of the eucalyptus treatment have fallen into this error.

In what follows I give considerable detail, so that the reader may be able to follow clearly the steps by which conclusions have been reached.

The Girls' Village Home, Barkingside, where the cases occurred, stands in its own grounds of 64 acres, and consists of 67 cottages, of which 63 are occupied by children, each in charge of a foster-mother. The accommodation of the cottages varies: most of them have 16, 20 or 25 girls each, there being a smaller number with 12 and 9 girls each. Excluding the receiving house, accommodating 50 girls, and one cottage of 20, used as an accessory receiving house, the population of the village is—

Children under 5 years of age	12
Children between 5–15 years	930
Girls over 15 years	284
Total	1226

The village has its own schools, church, and laundry. It is very difficult accurately to ascertain the number of children protected by a previous attack of scarlet fever. About 750 attend school daily. All attend church on Sunday. All except the younger ones attend an evening service on Wednesday, so that opportunities for transmission of infection, in order of probability, would be: (1) in the cottage, (2) in school, (3) in church, (4) at play, (5) from outside the village, by children going out or visitors coming in.

Frequency of Return Cases.

For the purpose of the present article reference will be made only to group (1) of the preceding paragraph. A return case is defined as scarlet fever occurring within a month in a cottage to which a child recently treated for the disease has returned. No distinction has been made between a month of 30 or 31 days. If there be an error in this reckoning, it is a constant factor over the whole period. Such a return case may not have arisen from the cottage; it may have arisen from one of the other possible foci, or from some focus unknown.

Upon this subject of return cases Dr. F. M. Turner[5] gave as his conclusion: "The alleged return cases include some coincidences as well as true cases, but the proportion of the former is small. Among scarlet fever outbreaks arising after the discharge of scarlet fever cases, the proportion is probably less than 10 per cent." Some authorities adopt a longer period than one month—viz., six weeks up to three months. Any patient who on discharge from hospital infects, or is alleged to have infected, another is referred to as the "infecting case."[6] Both the return case rate and the infecting rate will be given. In those cottages in which are two or more infecting cases, only one will be counted unless an interval of over one month elapsed between the first infecting case and the second return case, the latter then being reckoned as having arisen from the second infecting case.

A tabulation made of the incidence of scarlet fever in the village during 1921 showed an unusually large number of return cases. This suggested the tabulation of all previous outbreaks of the disease for purposes of comparison and to seek a cause for these return cases. The statistics of earlier years are from the infirmary admissions book, which contains a record of admission and discharge dates with diagnosis. In those days the medical officer was not given the amount of assistance which he obtains at the present time, consequently the records are not so full as in recent years. Some patients were treated in their own cottages; details of these cases are not available, which fact may account for a discrepancy in some of my figures compared with those published by Dr. Milne. From 1904 to 1910 patients were treated in three or more cottages used as hospitals, and subsequently in the new hospital, a modern building composed of three wards of 20 beds each and six wards of one bed each.

History of Scarlet Fever in the Village Home, 1902–1923.

The following paragraphs give the history of scarlet fever in the Girls' Village Home from 1902 onwards:—

1902–3.—Three cases each year; all were removed to the Ilford Isolation Hospital. No return case.

1904–5.—From Dec. 16th, 1904, to Nov. 18th, 1905, there were 105 cases. Of these 19 were removed to the Ilford Isolation Hospital; 78 were treated in the Village Home Hospital Cottages; of 8 I can find no record beyond the fact of notification. In reporting this outbreak, the late Dr. Milne wrote: "The most careful separation of the infected children and isolation of those who had been exposed was carried out." This quotation leads one to infer that up to 1905 Dr. Milne had not put into wide use in institutional practice his method, later recommended, of short-period treatment without isolation. These 78 patients were detained in hospital cottages on an average of 52·5 days each. There was only one return case, a rate of 1·2 per cent.

1906–7.—Two and three cases respectively; all removed to the Ilford Isolation Hospital. One return case.

1908–9.—From August 27th, 1908, to Nov. 10th, 1909, there were 31 cases, of which 3 occurred in the receiving house. The first 4 cases were removed to the Ilford Isolation Hospital. Of the 24 remaining cases no record can be traced of 5, which were probably nursed in their own cottages, leaving 19 treated in hospital cottages. Of the latter, one was detained in hospital seven months, one 50 days, one 39 days; the remaining 16 were detained on an average 19 days each. Among the 19 cases can be traced 3 infecting cases causing 5 return cases, giving an infecting rate of 15·7 per cent., and a return case rate of 26·3 per cent.

1910.—Nine cases, two of them in the receiving house; one was nursed in her own cottage, and six in hospital for 32, 28, 19, 75, 22, 191 days respectively. No return case.

1911.—Five cases, detained in hospital for 14, 20, 37, 47, 99 days respectively. No return case.

1912.—One case at the gate house, probably nursed in that house.

1913.—Four cases, three detained in hospital 10, 26, and 142 days respectively. No record of the remaining case. No return case.

1914.—Six cases, three in the receiving house, the other three detained in the hospital on an average 36 days each. No return case.

1915.—Seven cases, all detained in hospital on an average of 30 days each. No return case.

1916.—One case detained in hospital 20 days. No return case.

1917.—Two cases, one in the receiving house, the other detained in hospital 33 days. No return case.

1918.—Seventy-six cases occurred in cottages. They were treated in hospital, not isolated from children suffering from other diseases. The average stay of each in hospital was 12 days. In this year, in 21 different cottages, there were 35 return cases (46 per cent.). Among these, 24 infecting cases can be traced, an infecting rate of 31·5 per cent.

1919.—Ten cases, all detained in hospital on an average of 15·4 days each. One return case (10 per cent.).

1920.—Fifty cases in cottages, detained in hospital on an average of 16 days each. Four return cases occurred (8 per cent.). The infecting rate was also 8 per cent. I cannot say why the return cases were so much fewer in this year than one would have expected. In his text-book on Medicine, Osler[8] has said with reference to scarlet fever: "No one of the acute infections varies so greatly in the intensity of the outbreaks. . . . In some years it is mild, in others, with equally widespread epidemics, it is fearfully malignant."

1921.—In the cottages and among the nursing staff 133 cases occurred, 6 others were admitted from outside homes in Hackney and Stepney, and 19 occurred in the receiving house, making a total of 158 cases. Only the cottage cases will be referred to, as the subject here is return cases from the cottages. These 133 patients were detained in hospital on an average of 19·5 days each. There were in 14 different cottages 35 return cases (26·3 per cent.). There were 21 infecting cases, an infecting rate of 15·7 per cent. From Jan. 1st to March 20th, 1922, there were six return cases out of 24 patients discharged. On March 22nd all scarlet fever patients were isolated in one ward, and kept in for six

weeks or longer, until nose and throat were clear of evident disease. The eucalyptus and carbolic oil treatment was used as heretofore. An immediate drop in incidence and return cases took place, only one return case having occurred up to March 21st, which completed one year of isolation treatment.

During the year from April 1st, 1922, to March 31st, 1923, there were 27 village cases, among which are included one nurse and two girls in the hospital where they were treated. There was one cottage return case. To compare with a complete year of the non-isolation treatment, the following statistics are given. During the year April 1st, 1921, to March 31st, 1922, there were 124 patients with scarlet fever, among them 35 return cases, a rate of 28·2 per cent.; there were 23 infecting cases, giving an infecting rate of 18·5 per cent. In the following year, from April 1st, 1922, to March 31st, 1923, by no other change than keeping the patients isolated on an average of 54 days each, the incidence has been reduced immediately to 27 cases with one return case, a drop from 28·2 per cent. to 3·7 per cent. The return case was from a child kept in 40 days. Had she been detained a week or ten days longer the result might have been different; on the other hand, it might not.

It should be stated that on July 11th, 1921, the work was begun of renovating the drains in the village. By April 1st, 1922, 36 cottages had drains completed. During the following year, till March 31st, 1923, there were 16 fresh cases of scarlet fever in these cottages, as against eight cases in those in which the drains had not been finished. These figures would indicate that improvement in drainage had not been a serious factor in leading to the reduction in incidence of the disease.

Comparative Considerations.

So as the more easily to compile tables and make comparisons with other areas, the year of isolation will be dated from April 1st, 1922, to March 31st, 1923. Bearing this fact in mind with regard to the final two lines in Table A—the table contains some of the recorded facts relating to outbreaks of ten cases or over—from it the general truth emerges that, between a period of 10–50 days, the longer the period of detention the fewer the return cases. After a detention of 50 days it might be wise to transfer the patient to a non-infectious ward to avoid his mucous membranes having sown on them a fresh infection by acute patients recently admitted.[9]

TABLE A.

Year.	Total village cases.	Detention in hospital (days).	No. of return cases.	Percentage of return cases.	Infecting rate.
1904–5 ..	78	52·5	1	1·2	1·2
1908–9 ..	19	23·8	5	26·3	15·7
1918 ..	76	12·0	35	46·0	31·5
1919 ..	10	15·4	1	10·0	10·0
1920 ..	50	16·0	4	8·0	8·0
1921–2 ..	124	19·5	35	28·2	18·5
1922–3 ..	27	54·0	1	3·7	3·7

TABLE B.

—	April 1st, 1921, to March 31st, 1922.		April 1st, 1922, to March 31st, 1923.	
	No. of village cases.	% at village home of total cases in Ilford.	No. of village cases.	% at village home of total cases in Ilford.
April ..	13	26	4	22
May	18	60	4	16
June ..	13	41	4	21
July	11	36	4	16
August ..	6	31	1	12
September	10	35	3	15
October ..	17	40	1	11
November	3	9	4	28
December	12	24	2	15
January ..	15	34	1	11
February	9	30	2	25
March ..	8	28	*0	—

* In March there were 7 cases in Ilford.

Table B illustrates the drop in incidence in the village home as compared with that in the whole area of the Ilford Urban District Council, which includes the village home. In the year of more prolonged isolation, the village cases were a much smaller percentage of the total cases in the Ilford district than in the previous year. In both years eucalyptus and carbolic oil treatment was applied.

I cannot explain the irregular drop to three in the number of cases in November, 1921. Search for an explanation has been fruitless. The admissions for tonsillitis in October, November, and December, 1921, were 18, 14, 14 respectively.

Table C gives the percentage drop in incidence in the village home in the prolonged isolation year compared with the previous year, and similar figures have been prepared showing the drop in the M.A.B. area. The figure has been obtained thus: in one year were 14 cases, in the next year 4 cases, a drop of 10, which is a 71·4 per cent. decline. The M.A.B. figures show a decline due to the abating of the epidemic. There is a much greater decline in the village home figures, this decline being composed of the additional factor of more prolonged isolation of patients in hospital.

TABLE C.

—	Village cases.			M.A.B. cases.		
	1921–2.	1922–3.	% drop in incidence.	% drop in incidence.	1921–2.	1922–3.
April ..	14	4	71·4	23·2	1739	1335
May ..	18	4	77·7	33·6	2079	1379
June ..	13	4	69·2	44·3	2621	1460
July ..	11	4	63·6	45·9	2352	1272
August ..	7	1	85·7	42·6	1748	1002
September	12	3	75·0	60·6	3920	1544
October ..	17	1	94·1	72·2	5718	1586
November	3	4	+	67·5	3645	1184
December	14	2	85·7	61·3	2584	999
January	15	1	93·3	54·5	2527	1148
February	10	2	80·0	49·8	1649	826
March ..	9	0	α	38·7	1320	808

Spread of Infection in Wards.

In spite of the continued use of eucalyptus and carbolic oils, there was a spread of infection to susceptible persons. This is illustrated by the following examples:—

(*a*) *Nurses.*—(1) Nurse A., while nursing in a ward, between March 5th and 11th, 1921, attended six fresh cases of scarlet fever. On the 12th she was ill with the disease. (2) Nurse B., a new probationer, went on duty on Feb. 16th, 1922, in a ward where several patients had scarlet fever. On the 22nd she took the disease. (3) Nurse C. worked in a house where was a child who had scarlet fever on August 12th, 1921, and who was detained in the same house until Oct. 14th, 1921; the nurse took scarlet fever on Sept. 11th. Her duties would lead her into frequent contact with the child. (4) I have notes of four other nurses who have taken scarlet fever under similar circumstances during the past five years. Our nursing staff rarely exceeds 18.

(*b*) *Other Patients.*—(1) A girl aged 8 admitted with tuberculous peritonitis on Feb. 26th, 1921. On March 7th she was very ill with broncho-pneumonia. On the 10th scarlet fever supervened, followed three days later by death, which in my opinion was hastened, not caused, by scarlet fever. In the same ward were patients with scarlet fever being treated by eucalyptus and carbolic oils. (2) Girl aged 12 admitted with follicular tonsillitis on Nov. 29th, 1921; on Dec. 9th up and about the ward; on the 12th scarlet fever. In the same ward were six other children being treated for scarlet fever. (3) Girl aged 13 admitted with tonsillitis on Jan. 24th, 1921. On Feb. 4th up and about the ward; on the 9th scarlet fever. In the same ward was a case being treated for scarlet fever.

I have notes of other very similar cases illustrating this point. It must be understood that all these patients were being treated with eucalyptus and carbolic oils from the first suspicion of scarlet fever—that is, on the onset of sore throat. Some of these cross-infections may be coincidences, some may possibly be from outside sources, but it is surely against common sense and the laws of evidence to accept a bare possibility on the one side against a strong probability on the other.

Complications.

The use of eucalyptus oil and carbolic oil did not prevent the onset of secondary complications. Table D gives those in the village homes among 62 patients in 1922, and for comparison those occurring in the Ilford Isolation Hospital under the care of the medical officer of health, Dr. A. H. G. Burton, who has kindly given me his statistics:—

TABLE D.

Complications of Scarlet Fever in 1922.

—	Percentage of Village Home cases.	Percentage of Ilford Isolation Hospital cases.
Albuminuria	6·4	9·8
Adenitis	19·3	24·6
Broncho-pneumonia and death	1·6	nil
Endocarditis	nil	nil
Jaundice	nil	1·2
Otitis media	4·8	8·02
Rheumatism	nil	4·9
Rhinitis	4·8	nil or not stated.

Remarks.

The criticism will be raised that the treatment has not been carried out in the proper manner. In reply it should be pointed out that the matrons in charge of institutions in which I observed the treatment to fail had been there for several years under the late chief medical officer, Dr. Milne, and are still in charge of their nursing staffs. They agree that the application of the method had not changed in any way since the retirement of Dr. Milne towards the end of 1919; but in fairness to them it must be recorded that they retained their belief in the treatment while my faith failed. It was suggested that the eucalyptus oil was inferior to that used in previous years; a specimen was sent to the Clinical Research Association, Ltd., for examination, and the following report was returned: "March 14th, 1922, No. 8987. This is a specimen of genuine eucalyptus oil of very good quality. It conforms to all the British Pharmacopœia tests and contains 77 per cent. of cineol."

If the figures given of the period of detention in hospital of cases from 1910 to 1917 be examined, it will be found that they are not, on the whole, short; further, these cases are too few for any valid conclusion to be drawn from them. A striking fact is seen on examining the years 1904–5 and 1922–3 as set forth in Table A.; both periods have one return case, and a prolonged detention in hospital; the intervening years have a shorter period of detention, and many return cases.

It is generally accepted that in scarlet fever the desquamation of the skin is not infectious, but that the discharges from mucous surfaces are infectious, especially during the more acute stages of the disease. In a convalescent patient any discharges from the ear, nose, or throat, are to be regarded as infectious; and a patient should not be allowed to mingle with healthy children until these parts show no sign of active disease.

It would be sound treatment if all discharging ears, which did not clear up in eight to ten weeks after the throat, nose, and naso-pharynx had been treated were subjected to an incomplete mastoidectomy along the lines of the Heath operation. This would conserve the hearing, and remove a focus of disease in a potential carrier. Convalescent patients from scarlet fever who have hypertrophy of the tonsils which show signs of disease should have the tonsils enucleated. If the tonsils be atrophic but diseased they should be removed. Some of the indications for the removal of tonsils and adenoids after scarlet fever are mouth-breathing, rhinorrhœa, otorrhœa, an unhealthy angry-looking surface of a diffluent tonsil, and enlargement of cervical glands after rheumatism complicating the disease. The application of carbolic oil by swabbing to the throat is, in my opinion, of doubtful value, and may be harmful. The tonsils and fauces are acutely inflamed; to swab such an area not infrequently causes an abrasion of mucous membrane with slight bleeding, especially in young and nervous children, thus opening up fresh paths for the entry of pathogenic organisms. I am quite aware that carbolic oil has a local analgesic action which is sometimes appreciated, but I am not sure that the patient would not be more benefited by a hot inhalation of tinct. benz. co. or carbolic acid, by the use of which no trauma would be caused, but which would act as a hot fomentation to the inflamed throat. In a severe case of scarlet fever the infection invades, not only the tonsils and pharynx, but probably the nasal cavities and accessory sinuses, Eustachian tube, larynx, and trachea; hence the futility of seeking to apply any antiseptic to the infected area, beyond the cleansing of the mouth which is routine in all cases of fever.

Conclusions.

1. The use of eucalyptus oil applied to the skin, and of carbolic oil to the throat in the treatment of scarlet fever (*a*) does not prevent the occurrence of return cases, (*b*) does not prevent the infection spreading to susceptible patients and attendants during the course of treatment, (*c*) does not prevent secondary complications.

2. The number of return cases varies inversely as the length of the period of detention, when this period is up to about eight weeks.

3. All cases of scarlet fever should be isolated for at least eight weeks. They should not be allowed to mingle with other children until the ear, nose, and throat appeared healthy.

I wish to express very cordial thanks to Dr. A. H. G. Burton, the medical officer of health for Ilford, for assistance in obtaining statistics used in some of the tables, and for very willingly supplying information on many points discussed in this paper.

References.

1. Nash, E. H. T.: The Medical Officer, 1923, Jan. 6th, 11. Kirkhope, D. C.: Annual Report of the M.O.H., Tottenham U.D.C., 1922, p. 17.
2. Milne, R.: Brit. Med. Jour., 1908, ii., 1333.
3. Thresh, J. C.: In a note read by the chairman, Proc. Roy. Soc. Med., Epid. Sect., 1910, iii., pt. 2, 57.
4. Goodall, E. W.: The Medical Annual, 1910, p. 536, 1911, p. 564.
5. Turner, F. M.: Report on Return Cases of Scarlet Fever and Diphtheria, M.A.B., 1906, p. 13.
6. Cameron, A. G. R.: Ibid., 1901–2, p. 1.
7. Milne, R.: A Plea for the Home Treatment and Prevention of Scarlet Fever, Nisbet, 1910, pp. 17, 18.
8. Osler, W.: The Principles and Practice of Medicine, 8th edition, p. 333.
9. Simpson, W. J. R.: Return Cases of Scarlet Fever and Diphtheria. M.A.B. Reports and Papers, 1901, pp. 17 and 24 (viii.).

GASTRO-DUODENOSTOMY *V.* GASTRO-ENTEROSTOMY IN THE TREATMENT OF CHRONIC DUODENAL ULCER.

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IN spite of all that has been written about the medical treatment of duodenal ulcer, there can be no doubt that surgery is the safest and the most expeditious remedy for this disease as we see it at the present day. Possibly earlier recognition of the condition and of the primary infecting focus will render surgical treatment of the ulcer unnecessary. At present medical treatment is more dangerous than surgical. Acute perforation and hæmorrhage only occur after one course and usually after many courses of medical treatment; a surgeon may be called in to deal with these emergencies and the patient may succumb, but the death must be placed to the account of medicine, for surgical treatment before the catastrophe would almost certainly have prevented it, and the death-rate after gastro-enterostomy in the chronic stage of the disease is negligible.

When we consider the progress of a patient after surgical treatment we find that most surgeons state

that they cure between 80 and 90 per cent. of their patients, and undoubtedly gastro-enterostomy, accompanied by local treatment of the ulcer and eradication of a supposed primary infecting focus, is a highly satisfactory operation. Whether it is true that so high a percentage of cures is effected is perhaps an open question, and depends on the definition of cure. Indiscretions in diet or habits, in a fair proportion of these cases, are apt to cause temporary discomfort in the form of flatulence and a feeling of uncomfortable distention, which may be quickly recovered from, but serves to show that the reserve territory, as it were, between health and disease has been considerably reduced, and that though the ulcer has been cured in that there are no recurrences of ulcer attacks, the remedy has exposed the patient to inconveniences to which a normal person is not liable.

The progress after medical treatment is almost invariably a recurrence of the ulcer attacks; there is remission of varying duration, but not cure in any sense. Medical treatment has to be so prolonged, and is so irksome, that the patients will not be bothered with it once the attacks have thoroughly subsided. However, it is my intention not to contrast medical and surgical treatment further, but rather to criticise surgical opinion in its relation to duodenal ulcer—that is to say, whether it is right to regard gastro-enterostomy as *the* operation to perform.

Gastro-duodenostomy: Trial Advocated.

We have become so accustomed to treating chronic duodenal ulcer by this operation that the mention of the one almost automatically calls up in one's mind a vision of the other. In the earlier days of the treatment of this disease gastro-enterostomy had many rivals, but it gradually ousted them all, as the results achieved were found to be so much superior to those attained by any other method which received an adequate trial. There is one operation, however, which I think has never had such a trial, and which in the opinion of a few surgeons still holds its ground as a successful rival to gastro-enterostomy, but only under exceptional circumstances. I refer to gastro-duodenostomy. The present-day surgical opinion may be briefly stated as follows. With a favourable disposition of the parts gastro-duodenostomy may be performed, and the results will be as good as those after gastro-enterostomy; but gastro-enterostomy will have to be done in the vast majority of cases, because the duodenum cannot be sufficiently mobilised. The operation, therefore, is only performed in some 4 or 5 per cent. of cases at the most. Since 1894, when Jaboulay first did gastro-duodenostomy, this has been, generally speaking, the recognised surgical opinion, though no one, so far as I know, has done the operation in a consecutive series of cases.

Technique.

Surgical text-books give the scantiest attention to this operation, when they mention it at all. Probably anatomists are partly responsible, because they have always taught that the duodenum is a fixed organ like the ascending colon, whereas both organs have a considerable degree of mobility; the ascending colon practically always, and the second part of the duodenum not infrequently, has a definite mesentery. I venture to say that after dividing the peritoneum on the posterior abdominal wall to the outer side of the duodenum very little further manipulation will suffice to bring the duodenum to the surface of the usual abdominal wound used for stomach operations, not only where the duodenum is normal, but even when a duodenal ulcer is present. That this is no exaggeration is shown by the fact that in the last 53 cases of duodenal ulcer I have been able to perform gastro-duodenostomy in 50, and had to employ gastro-enterostomy only three times—twice because of dense pathological adhesions, and in the other case (a boy aged 12) because there was such a large inflammatory mass around the ulcer that I thought it wiser to leave the neighbourhood alone. I may come across a long series in which it will be inadvisable to do gastro-duodenostomy, but those cases on which I have already done it have been the type of duodenal ulcer usually met with. I think this operation will be possible in some 90 per cent. or more of cases, and that consequently gastro-enterostomy will only need to be performed in less than 10 per cent.

After mobilising the duodenum in the manner already indicated, and after dealing with the ulcer by cautery or otherwise, an anastomosis is made between the second part of the duodenum and the anterior surface of the stomach close to the pylorus; the suturing is done exactly as in gastro-enterostomy. The raw area left on the posterior abdominal wall can easily be covered by peritoneum or omentum.

The only impediment to the more frequent employment of this operation is the supposed difficulty in mobilising the duodenum, for if one asks a surgeon whether he performs this operation he answers that he does in suitable cases, implying that he regards it as equal in efficiency to gastro-enterostomy when it can be done. I maintain that it can be performed in nearly every instance, and with no more risk to the patient than that attached to gastro-enterostomy. If I am right in this, I think there are material advantages to be derived from employing it more frequently.

It is rather difficult to compare the results after gastro-duodenostomy with those after gastro-enterostomy; the latter operation has been performed so infinitely more often that it is only natural that one should see more cases requiring further treatment than after the former. Many surgeons have done gastro-duodenostomy on rare occasions, and in the aggregate this means quite a large number have been performed, yet I have never heard of a surgeon regretting that he did the operation, and I have never seen a case return for further treatment of any sort. It is quite true that gastro-enterostomy gives very good results, but no surgeon who sees many stomach cases can say that he has not had many, either of his own or someone else's, return to him incompletely cured, sometimes, indeed, worse than before. No case has been reported of the occurrence of an ulcer at the line of the anastomosis after gastro-duodenostomy; this complication occurs in at least 2 per cent. of cases after gastro-enterostomy. The patient is then in a much worse state than before the original operation, for this disease is more crippling, and a very formidable operation is necessary to cure it.

It is so unlikely that an ulcer will ever be seen at the anastomotic line after gastro-duodenostomy that when I have a gastro-jejunal or jejunal ulcer to deal with I excise it, suture the openings in the stomach and jejunum, and do gastro-duodenostomy. I believe this will become the usual treatment, until the performing of gastro-duodenostomy in the first instance renders an operation for these anastomotic ulcers unnecessary. Hitherto, gastro-duodenal ulcers have been treated by excision and a new gastro-enterostomy, or better by partial gastrectomy; neither of these can be relied upon to prevent another ulcer of the same kind returning, for I have seen one certain case, and I think a second, in which a gastro-jejunal ulcer appeared after partial gastrectomy.

Other Considerations.

Two further considerations may be of importance. In performing gastro-duodenostomy one does not interfere with the small intestine below the great omentum, whereas, of course, in gastro-enterostomy one does, and it is usual to find adhesions of some coils of the small intestine to the neighbourhood of the anastomosis, which, at any rate, cannot be a desirable state of affairs. The other point is, that wherever a new opening is made it will produce some tethering of the stomach, and it would seem to me better that this should occur at a point normally somewhat fixed as the pylorus is, rather than on the freely moving posterior surface of the stomach.

From a physiological point of view gastro-duodenostomy should be the better operation, as it is a much nearer approach to Nature's plan. It may be

said that a gastro-enterostomy opening being at the lowest point of the stomach will drain this organ more effectively, but the stomach of a patient with a duodenal ulcer is either a shallow high-lying one, or a big hypertrophied organ with powerful muscular contractions. It is only reasonable to suppose that Nature, having placed the pylorus at the most favourable point, will continue to utilise an opening as near the normal one as possible to better advantage than one at some distance away, as is the gastro-enterostomy opening.

It is still early to speak of the results in my series, as these cases refer to a period of only a year, but up to the present the post-operative progress of the patients has been most satisfactory—certainly as good as, and I think better than, after gastro-enterostomy. The question of mortality need not be brought into the discussion; there have been no deaths in my series, and, of course, there is practically no death-rate for gastro-enterostomy; it is less than 1 per cent.

I believe gastro-duodenostomy to be both more natural and physiological (if one may use the term in connexion with any short-circuiting operation) than gastro-enterostomy, and I believe it will be found possible to perform it in all but a very small percentage of cases. It should be remembered, too, that in a small percentage of cases it is also impossible to do posterior gastro-enterostomy, either because of a very small stomach in a fat patient, or because the lesser sac, or that part of it which is required for the operation, is obliterated by adhesions. Anterior gastro-enterostomy is then usually done, and this is not a desirable operation.

Clinical and Laboratory Notes.

A CASE OF ACUTE MYELITIS, WITH RECOVERY.

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IT is well known that complete or even partial recovery from acute myelitis is rare, death usually occurring from ascending urinary infection, trophic disturbances, or pulmonary complications. The following case is perhaps unique, in that the patient, who showed all the signs and symptoms associated with that condition, suffers after nine months from no serious effects, with the exception of some difficulty in retaining his urine.

History.—A male, aged 47, engaged in secretarial work, was seized on Oct. 25th, 1922, with very severe pain in the scapular region at about 7.30 P.M., followed two hours afterwards by severe pains in both feet. He went to bed shortly afterwards. On waking up in the morning the pains in the back were less, his feet still ached, and he had lost sensation and power of movement of his lower limbs. His bowels were confined and in the evening he observed incontinence of urine. He had been in the Navy 8½ years; there was no history of syphilis. He had had gonorrhœa at 17 years of age and "Malta flux" at 30, otherwise he had had no serious complaints. He was married and had a healthy child of 5; his wife was apparently healthy and there had been no miscarriages. He was sent to the London Temperance Hospital on the 30th, four days after the onset of the condition, with a diagnosis of acute intestinal obstruction.

Condition on Admission.—Pulse 120, respiration 30, temperature 96·6° F. Patient of good physique, tongue thickly coated; abdomen distended, with some rigidity, especially in upper half; retention of urine with overflow, and complete confinement of bowels. Nervous system showed the changes usually associated with complete transverse myelitis; complete anæsthesia to heat and touch from the xiphisternum downwards; above this area, which extended upwards and backwards to the outer edge of the erector spinæ, there was an ill-defined band of hyperæsthesia. On the right-hand side the anæsthetic area reached up to the umbilicus only. Paralysis of the lower limbs and lower abdominal wall was complete; no control over the rectal and urinary sphincters. Knee-jerks, Achilles-jerks, plantar and abdominal reflexes were absent. Right pupil showed some irregularity in outline, but both sides reacted normally. Trophic changes were evidenced by presence of pressure ulcers in lower dorsal and sacral regions, as well as over both heels. Repeated examination of the cerebro-spinal fluid, which on the first occasion flowed at a slightly increased pressure, showed no macroscopic, cytological, or chemical changes; it was sterile, and the Wassermann and blood reactions were repeatedly negative. The other systems appeared normal.

Course of Case.—Sensation gradually returned, and on Nov. 3rd the hyperæsthetic area had disappeared, superficial and proprioceptive sensation had been re-established, though deep pressure was painful. Some spasticity of the lower limbs was present. On the 10th very slight effusion into the knee-joints occurred, also, later, some periarticular swelling of the right metacarpo-phalangeal joint; these conditions, however, subsided entirely. At this time a very small degree of abduction and adduction at the hip became possible, as well as flexion and extension at the knee and ankle. The knee-jerks and abdominal reflexes were just obtainable. Improvement was maintained, and on Jan. 3rd, 1923, the patient got up and was able to stand on his legs. Some control over the rectum had been established, and the patient managed to retain his urine for one to two hours.

Partial Recovery.—The patient was discharged on March 7th. Sensation was normal; walking was possible with the aid of a stick; the gait was shuffling in character; there was some difficulty in turning about. The knee-jerks were slightly exaggerated; the plantar reflexes were of the extensor type. No Rombergism or ataxia was present. Control over the rectum was almost complete. As regards micturition, the patient had about two minutes' warning, after which the bladder emptied reflexly; it was necessary, therefore, to wear a urinal. He is now able to stand seven to eight hours a day, and can walk six to seven miles quite comfortably. Occasionally he has some cramp in his feet; the urinary mechanism has improved, and there has been a gain in weight to the extent of 22 lbs. Treatment was symptomatic; massage and faradism were commenced very early.

For permission to publish this case I am indebted to Dr. Porter Parkinson, senior physician to the hospital.

AN UNUSUAL CASE OF CHICKEN-POX.

BY H. COOPER PATTIN, M.D., D.P.H. CAMB.,
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ON a certain Monday my assistant, Dr. G. L. Leggat, was taking a school clinic, and experienced a shock when a woman brought into the room a girl, aged 11, with what, at first sight, looked like small-pox. After careful investigation of the rash, which in distribution was certainly that of small-pox rather than of chicken-pox, noting that it was at varying stages, that the girl had four good vaccination marks, that she appeared to be quite well, and learning that she had never been ill, Dr. Leggat diagnosed the case as one of chicken-pox and referred the case to me. Looking at the distribution of the eruption, my first impression was that it was small-pox; but going carefully over the character of the rash and the history, I concurred with Dr. Leggat's diagnosis and agreed that it was one of chicken-pox; albeit the most unusual case I had seen. Whilst there was a generalised distribution of rash it was most abundant on the face, forearms, hands, legs, and feet, some on plantar surface of the latter; it appeared on the flexor as well as extensor surfaces, and was, in places, almost confluent.

The history was this. The girl had been to a school treat on the preceding Thursday, which was a very hot day with a broiling sun, and her face, arms, hands, legs, and feet had been freely exposed to the sun, as also had the back of her neck and interscapular area, where the eruption also was dense. She came home tired, but quite well, and developed some vesicles during the night; at any rate these were very noticeable in the morning; the mother called in no doctor, and in fact only brought her up to the school clinic on the following Monday because she had become alarmed at the further and more profuse development of the eruption; when seen by us many of these

vesicles had become pustular and a few had maturated and become encrusted. The girl was never ill at any time.

The explanation we arrived at respecting the unusual distribution of the eruption was that the sun's heat had given rise to some heat erythema of the exposed parts, and that this accidental superficial irritation had determined the profuse character of the subsequent eruption; and this belief has been fortified by a few other cases, but none of so striking a character. Subsequently our diagnosis received confirmation by the occurrence of chicken-pox in a sister 17 days after the appearance of the eruption in the first instance. In Dr. McC. Wanklyn's book on "How to Diagnose Small-pox," on pp. 58–59 there is recorded a strikingly similar case. The point is worth considering when chicken-pox erupts in hot sunny weather.

THREE CASES OF SCURVY.

BY ROBERT H. NORGATE, M.R.C.S. ENG.,
MEDICAL SUPERINTENDENT, SOUTHMEAD INFIRMARY, BRISTOL.

DURING the past two years there have been three cases of scurvy under treatment in the Southmead Infirmary, Bristol. Such cases are unusual now that conditions of life are more normal.

CASE 1.—Female, aged 28, admitted Nov. 23rd, 1922, from a Poor-law institution, where there is always an abundance of green vegetables in the diet; the patient, however, always refused to take vegetables and took an excess of salt with her food. Temp. 98·6° F., pulse 94, resp. 16. Spongy gums, teeth buried in them; hæmorrhages in legs and follicular keratosis on both arms and legs; skin very dry, with a stained appearance; patient thin and haggard. Some fœtor of the breath; no hæmorrhage in urine or stools; no albumin. Green vegetables were insisted upon at each meal and oranges were given. She made a rapid recovery.

CASE 2.—Male, aged 52, a labourer, sent in on April 20th, 1923, as a case of iliac thrombosis complicating tabes dorsalis; no abdominal pain; right leg very red, with swollen spots; hæmorrhages in the tissues, several purpuric blotches on both legs, and follicular keratosis. Typical signs of tabes; no hæmorrhage in stools or urine; both iliac arteries and right popliteal artery pulsating; history of leg swelling now and again, and this time four days. Patient was kept in bed at rest and plenty of green vegetables and oranges given daily, and salt decreased. Patient has only one tooth, but the gums are very red and spongy and bleed easily. He was able to get up in a month and was discharged on June 2nd, all swelling and signs of hæmorrhage having disappeared. He had been living on tinned foods, with no vegetables; he had been out of work for a considerable time, owing to tabes, and was unable to walk far.

CASE 3.—Male, aged 58, a clerk, had seen better days but had recently been out of work. Sent in as a case of rheumatism on June 2nd, 1923; seen by assistant medical officer and diagnosed as "iliac thrombosis." For two weeks the right leg had been swollen and there had been purpuric hæmorrhages like hæmatomata in muscles of the calf; keratosis on both arms and legs; popliteal vessel pulsating; gums so swollen as to almost hide the teeth, and bleeding easily. Patient had been living in common lodging-houses, eating salt meat and tinned foods with no vegetables, having no facilities for cooking the latter. Lettuce or other greenstuff is very scarce and expensive this year, and not being a tramp patient had not had opportunity of getting it. The case ran the ordinary course. All hæmorrhages have now disappeared, and he is now well.

On discharge each case was warned as to diet and the necessity of green food.

POST-GRADUATE TEACHING IN LIVERPOOL.—A course of clinics under the auspices of the Board of Clinical Studies is being inaugurated for the coming winter. The underlying idea is to provide each day of the week at 3.30 P.M. a demonstration of clinical material of interest to the general practitioner. The work is being undertaken by the honorary staffs of the hospitals, both general and special, and all the hospitals of the city are taking part. Advantage may be taken of as many or as few of the meetings as may be found practical by local doctors, and the favourable reception given to the preliminary notices suggests that the effort of the Clinical Board is meeting a real want. The clinics will be free.

BRITISH MEDICAL ASSOCIATION.

ANNUAL MEETING AT PORTSMOUTH.

(Continued from p. 463.)

SECTION OF TUBERCULOSIS.

WEDNESDAY, JULY 25TH.

AT the opening session of this section Sir HENRY GAUVAIN (Alton), the President, being in the chair, Prof. AXEL REYN (Med. Supt., Finsen's Medicinske Lysinstitut, Copenhagen) read a paper on the

Artificial Light Treatment

of lupus and other forms of tuberculosis. This treatment, he said, is used in two forms, either in concentrated form as a local application or in non-concentrated form as a light bath. Finsen used the carbon-arc light as the nearest approximation to sunlight, particularly because it contains more ultra-violet rays than the sun, these rays having the strongest effect. The sun-bath treatment, so successfully applied by Bernhard and Rollier, is, because of natural conditions, difficult of application in northern countries and must therefore be replaced by artificial means. The lamps used require to be specially constructed. That for local treatment is a 50-ampère lamp with convergent lenses of rock-crystal for concentration, the heating rays being absorbed by distilled water interposed between some of the lenses. For the light bath 50 to 52 volts are the most advantageous, working with 70 volts on the conducted current, the surplus being necessary for quiet and steady functioning. Glass as an envelope is not used. Where a number of patients require to be treated at the same time 75-ampère lamps are used, the intensity of the light decreasing, of course, with the square of the distance. As to the class of case so treated:—

1. Lupus vulgaris and other forms of skin tuberculosis. In this class the value of the local light treatment is incontestable, and in those patients refractory to it a combined local treatment and the light bath have produced something like 90 per cent. of cures.

2. Surgical tuberculosis. In these cases sinuses, abscesses, &c., the results of treatment have been excellent, more especially when regard is had to the fact that the majority were adults with poor and unhealthy homes, treated as out-patients and chronics. In a large number it is noteworthy that cure has been accompanied by the regaining of free mobility of the joints. The results indeed are as good as those obtained by heliotherapy in mountain heights.

As one would expect, a shorter period of treatment suffices for children than for adults, for affections of the small joints than for those of the large, and for disease of the soft tissues and bones. Tuberculous glands form a special category in which brilliant results have followed treatment by a combination of carbon-arc light, X rays, and light baths alone. It is to be understood, of course, that necessary operative measures for the correction of deformities and ankylosis are indispensable. The good results from treatment are due to the chemical power exercised by the rays of light which produce erythema of the skin, pigmentation, and stimulation of the organism generally, and various investigators have shown that the greatest effect is produced by ultra-violet long-wave rays. The carbon-arc light contains all the rays of the spectrum, whereas the mercury-vapour lamp emits mainly the short-wave ultra-violet rays with little power of penetration. The latter is therefore less suitable for use. The best results are only to be obtained if a pronounced erythema is produced in the earliest stages of the treatment, contrary to Rollier's opinion. As it is essential to employ the relatively deep penetration of the carbon-arc rays the tissues subjected to the process must be made bloodless by compression. Methods of treatment which aim only at producing a superficial effect, as in cases of extensive lupus, will fail.

Prof. Reyn showed several charts and tables and related illustrative examples of the treatment outlined above.

Dr. J. H. SEQUEIRA (London) stated that many of those who began to employ the Finsen-light treatment when there was a boom in such methods failed to achieve good results because of lack of technique. Treatment by the concentrated arc light is expensive, and by employing the arc bath the duration of exposure is shortened and the expense is less. Exposure of the whole body also renders the local action more effective. Both local and general treatment should be the method of attack, in which excision, the use of salicylic acid, creasote, and so on, may be helpful in given cases. From an æsthetic point of view the value of the light treatment is considerable. In dry lupus it is the ideal method of treatment and in ulcerative conditions may be of great service. Having employed the treatment for over 23 years he could testify to the permanence of the cures obtained by its aid. The cases contrast with the effects of treating tuberculosis by the indiscriminate use of the X rays—e.g., in lupus, in which ten years after carcinoma may follow, produced solely by the rays. Nevertheless, X rays do produce good effects with occasional short exposures in ulcerative cases. The Finsen-light treatment, besides the local benefit it produces, also improves the general health of the patient, who becomes noticeably bright and alert. Complicating lesions in other parts of the body also heal up, although they have not been locally treated at all. Lastly, the treatment is cheap and costs but 10*d.* per hour to run.

Prof. SIDNEY RUSS (London) discussed the wave-lengths of the portions of the light spectrum which could be employed, and it was now possible to assign specific reactions to their appropriate wave-lengths. Between 3000 and 2000 (Angström units) waves are readily absorbed by animal tissues, and have a germicidal action, as has been shown by exposing agar plates to the ultra-violet radiation from the tungsten arc. The germicidal action is maintained until a certain wave-length is reached, after which the action is not produced. There is no radiation produced between wave-lengths of 2000 and 3000. They cannot penetrate as much as a millimetre of skin. Between 3000 and 3800 absorption ceases very abruptly, and it is to this region that we must go for effective radiation. Thus full radiation of the sunlight or artificial light is beneficial; if filtered to a wave-length a little less than 3000 benefit is still produced; filtered to get still shorter wave-lengths has no beneficial effect. Those who pigment react favourably to light treatment, which is a necessary part of the treatment. If different artificial sources of light are taken their characteristics differ considerably—e.g., mercury, carbon, &c.—the skin reaction, therefore, depending on the source of the light and the wave-length. It is essential that these characteristics should be ascertained when the results, from an economic point of view, will be justified.

Sir STCLAIR THOMSON (London) was impressed by the fact that when he visited Copenhagen it was claimed that 50 per cent. of cases of tuberculous laryngitis were arrested by the light treatment, as he himself by all other methods had only 25 per cent. of arrests. Thus of 500 cases of tuberculous laryngitis treated at Midhurst during the last ten years, 75 per cent. are dead, most of them from general infection. Without doubt, therefore, if the light treatment can produce arrest in 50 per cent. of these cases, and tuberculous laryngitis is the most serious of all complications of the disease, a great step forward will have been taken.

Dr. J. M. JOHNSTON (Tor-na-Dee) had used the carbon-arc lamp in two severe cases of tuberculous laryngitis, in one of whom the severe pain was relieved though the disease was advanced. In the other, after six weeks the patient was practically free from pain and all local treatment was stopped. In the treatment of sinuses the results have been remarkably good when all other forms of treatment had failed. He considered that the method, limited though his experience had been, has a definite sphere of usefulness.

Prof. REYN, in replying to the discussion, stated his opinion that the Finsen light installation at the London Hospital was the best that he had seen in any country. Two points were insisted upon—technique and general measures in treatment.

The PRESIDENT, conveying a vote of thanks to Prof. Reyn, remarked that though light therapy had proved itself of great value in tuberculosis and other diseases the final answer to the whole problem is a clinical one. It is not enough to study the source of the light used in treatment, the patient himself and his individual reactions must also be taken into account.

Dr. J. GRAVESEN (Med. Supt., Vejlefjord Sanatorium, Denmark) then read a paper on the present position of the

Surgical Treatment of Pulmonary Tuberculosis.

Modern developments, he said, of surgical treatment applied to cases of pulmonary tuberculosis have followed the practice of artificial pneumothorax. It is a serious drawback to the latter that it and subsequent methods are being used only in advanced cases and are so dependent on a most scrupulous technique, and results must be judged according to the anatomical and physiological possibility of deriving full benefit from the treatment. It becomes necessary to classify the cases with regard to the influence exerted by the presence of pleural adhesions. Tables shown made manifest how frequently adhesions handicap the full benefit of artificial pneumothorax. Classified, the cases fall into the following groups: (1) Cases with complete pneumothorax: (*a*) without adhesions, (*b*) with localised, extended adhesions; (2) cases with incomplete pneumothorax with larger adhesions; (3) cases with universal adhesions—no pneumothorax practicable.

1. Cases with complete pneumothorax without noteworthy adhesions generally prove successful with marked improvement in symptoms, &c., and, in the absence of complications, no further operation is done. Treatment is individual and the optimum pressure and length of interval between insufflations settled according to the clinical indications. In complications, particularly pleuritic effusions, special care is taken so as not to influence the result of treatment. As to the relationship between pneumothorax and ordinary pleurisy with effusions it is found that the addition of insufflation to ordinary aspiration has checked the development of adhesions and allowed the performance of a pneumothorax successfully.

2. Cases with complete or almost complete pneumothorax, but with localised, extended adhesions—thoracoscopy with cauterisation. The only method to be recommended for endopleural operation and the removal of adhesions is that of Jacobaeus, a method of both diagnostic and therapeutic importance. The thoracoscopic method of Jacobaeus enables one to obtain a direct localisation of adhesions, connecting or supplementing that obtained by the X rays. By cauterisation with a platinum wire introduced through a separate cannula adhesions have been destroyed and successful pneumothorax induced. It is a procedure of permanent value in a limited number of pneumothorax cases with string-like or membrane-like adhesions. The cauterisation of surface adhesions may involve the risk of hæmorrhage and the opening of tuberculous foci and cavities with a consequent infection of the pleura, the most serious complication hitherto encountered. Only a weak, redly-glowing galvano-cautery is used. To sum up the results of the author's experience—none of the technical or clinical complications is of such grave importance as to warrant abandoning the method in suitable cases.

3. Artificial pneumothorax not possible to any satisfactory degree—thoracoplasty. The indication for the performance of this method arises when, in cases fit for lung collapse treatment, careful attempts at artificial pneumothorax have failed. Owing to the greater risks involved, however, a more pressing

need of collapse and a more reliable condition of the diseased lung are demanded. Before doing the operation we have to consider (1) whether a partial or a complete thoracoplasty should be done; (2) or the operation done in one, two, or more stages. (1) Partial thoracoplasty may be considered sufficient, either when the affection—e.g., a cavity—is localised to a limited area of the lung, or when a partial pneumothorax has been so established as to provide collapse for the upper or, more frequently, the lower part of the lung. It is unsafe to allow the lower part of the lung to remain expanded owing to the dangers following a post-operative aspiration of sputum into the moving lower lobe. In cases of universal affection of the lung a partial and ineffective pneumothorax should be discontinued in favour of a complete thoracoplasty, modified, of course, according to the extent and special localisation of the disease, a slight affection of one lobe indicating a relatively slight resection of the ribs, large cavities, and more serious disease indicating a more radical resection. (2) The performance of the operation in one or more stages will depend on the individual indications afforded by the patient himself, whether or not he is muscular or lean and healthy, or whether or not he appears to be able to tolerate the completion of the operation in one stage. In cases of doubt we consider the two stage operation to be less risky. The technique followed is that recently described by the author in *Tubercle* (1921, ii., No. 9) except that smaller doses of the local anæsthetic, novocaine-adrenalin, are now used followed by a light ether anæsthesia, sufficient to neutralise the pain, but not to abolish the cough reflex. The results in 105 cases have shown that though a greater risk and a smaller result are to be expected from thoracoplasty than from a successful artificial pneumothorax, the former operation results in a great improvement in the prognosis in such cases as are deprived of the effect of the pneumothorax treatment.

4. Cases of insufficient collapse with simple thoracoplasty. It is still to be considered that the fullest possible resection of the ribs through the posterior incision (Sauerbruch's "hook incision") may fail so that the author has now added in these cases resection of the anterior ends of the upper ribs (except the first owing to its inaccessibility), done either at the second stage of the posterior operation or as a separate third stage, and in extreme cases performing an extrapleural apicolysis through the anterior incision, the cavity being plugged with gauze and allowed to heal gradually by granulation and retraction, or with fat, as, in one instance, transplanted from the patient's abdomen. But cases necessitating this procedure are very rare indeed, nor is there such a large field of indication for it as for thoracoplastic resections.

After Dr. Gravesen had read his paper he showed one of his patients, now his most valued nurse in the sanatorium. She was considered to be in a hopeless condition in 1919, but an operation, as described in his paper, was performed in September, 1921, with an excellent result, as the audience were able to see for themselves.

The PRESIDENT considered the two methods of treatment were a great advance, and as a result one could now replace Dante's familiar lines, "All Hope abandon ye who enter here," by "Revive Hope ye who enter here," so far as the treatment of those severe and advanced conditions were concerned.

Mr. J. E. H. ROBERTS (London) did not think it right to assume always that the presence of adhesions is the cause of the bad result obtained by operation. It is quite possible that the results are bad because the type of infection is bad, and that no surgical procedure, under the circumstances, might be successful. One must consider, having regard to the indications for operation, the good-class patients who are able to undergo the prolonged treatment and the poor patients, especially those who afterwards have to return to manual labour. Though adhesions of the "band" type can be divided safely, most types of adhesions cannot be so treated without grave risk. He considered, therefore, that a thoracoplasty must replace the other procedure, though the operation, in his opinion, is still in the experimental stage, and the technique has not been finally established. The class of case chosen for operation, too, is usually the worst, and the results may improve if patients are operated on in an earlier stage. He disliked ether in thoracic cases. Gas and oxygen have all the advantages of the general anæsthetic and none of the disadvantages. The injection of alcohol into the intercostal nerves, when they are reached, reduces shock, paralyses the intercostal muscles, and puts the side affected at rest. After-treatment is of the utmost importance. Mechanical causes may produce afterwards a great, and sometimes serious, increase of the bronchial secretion, when atropine may be of great service. Any tendency to post-operative scoliosis can be prevented by suitable exercises.

Dr. S. VERE PEARSON (Mundesley) emphasised the necessity for these methods of treatment being carried out in a sanatorium, removing the patient from home conditions. It would not be wise to withhold operation because one thinks that adhesions have formed or are going to form, and one should attend to the indications yielded by ordinary physical examination rather than to those yielded by the X rays. He considered that in many cases too long an interval was allowed to elapse between failure to induce an artificial pneumothorax and the performance of a thoracoplasty. Only those having special experience should do the operation. It is not only a capable carpenter who is wanted, but also a capable physician. Nor is an ordinary surgical nursing home suitable for such cases, for the staff lack the necessary experience.

Dr. L. T. BURRELL (London) thought that unilateral cases of disease are more suitable for operative measures, and earlier thoracoplasty might prevent unilateral disease from becoming bilateral. The essential principle is absolute rest before and after treatment. Thoracoplasty is a great advance in treatment, but one should avoid using the word "cure."

Dr. CLAUDE LILLINGSTON (Gorleston-on-Sea) wondered why a small country like Denmark should be so far ahead of us in this matter of the surgical treatment of tuberculosis of the lungs.

Mr. R. TUDOR EDWARDS (London) had done six cases of thoracoplasty, using local anæsthesia under which no real evidence of shock had been observed. He agreed that cases were not got early enough for operation, and, further, in advanced stages of the disease the heart is poisoned and cannot stand the pushing over of the mediastinum which is a necessary part of this operative procedure.

Dr. GRAVESEN, in reply, emphasised the necessity of the expert being expert in everything; the surgeon should also be physician, and the patient should be operated on in the sanatorium where he is under supervision. Answering certain questions and observations arising during the discussion, Dr. Gravesen stated that small effusions in cases of pleurisy sometimes acted beneficially—large effusions acting like a perfect pneumothorax. Scoliosis after a thoracoplasty helps to keep the lung in a collapsed condition, assisting also the circulatory and respiratory balance. He suggested that certain cases of sudden death following the operation might be due to hæmorrhage.

THURSDAY, JULY 26TH.

On the second day, Dr. R. A. YOUNG (London) occupying the chair, Dr. JANE WALKER (London) opened a discussion on the

Social Aspects of Tuberculosis,

with special reference to its infectivity. She said that although tuberculosis is regarded as one of the great killing diseases, being responsible for 10 per cent. of all deaths, it is becoming increasingly clear that the more we know of the disease the more there is to know about it. So far as this country is concerned, the

mortality-rate has, however, been falling steadily for the last 150 years and, therefore, cannot be fairly put down to the extra work done and attention paid to it. No doubt the fall is mainly due to causes which have helped to lessen the general mortality-rate, such as the improved standard of living, housing, cleaner clothes, better food, and so forth. But the fall is not constant and is going up in Germany and in Russia, amongst others, and in our own country rose during the war in women, probably as the result of their entering factories in such large numbers, together with the restrictions in food. Too much attention is paid to the seed of the disease, and too little to the soil. Thus the dictum that no big eater ever caught consumption is substantially true and points its obvious moral. For infection to take place contact must be close and prolonged, and the recipient be in a more or less debilitated state. Referring to the recent case—Collins *v.* Hopkins—decided by Mr. Justice McCardie, it is greatly to be regretted that there is no recognised standard, legal or medical, of what constitutes proper disinfection.

Two theories at present hold the field in regard to the spread of the disease: (1) The dose must be massive, intimate, and prolonged; (2) the attack depends on the virulence of the organism. And in both predisposition—i.e., the soil—must not be forgotten. Probably the evidence in favour of the former being the correct view is greater. There is much to be said for the view that, considering the universality of infection, there arises the possibility of a general immunisation of the human organism, as is the case, for example, in scarlet fever; and that the drinking of milk in early childhood containing tubercle bacilli confers immunity. Be that so or not, the clean milk campaign is still one to be encouraged in every way. Tuberculosis is without doubt largely an industrial disease. Treatment in sanatoria has done much good and has cured numbers who otherwise would have been lost to the community, especially amongst the young whose work is still to be done and whose best days are not over. Given to advanced cases it has afforded not only help to the patient but relieved friends and families of anxiety and checked the spread of infection. The value of individual help at the sanatorium in the shape of small talks and advice, the attention paid to a sufficiency of good, wholesome, and yet plain food has been incalculable. Children should have a sufficiently long period of efficient treatment to give them a real chance of acquiring lasting immunity. For the improvement in habits of personal cleanliness, very noticeable in children from the East End, the school medical and nursing services are to be thanked. In general people now live better and certainly drink less. They breathe a less smoke-laden atmosphere and labour-saving devices help to lessen the drudgery of life. We ought to ensure the same good opportunities of treatment to the civilian as to the ex-service man and make satisfactory provision for wife and children while he is away undergoing treatment. Effective after-care machinery is necessary. The question of fitting the patient for particular trades is a difficult one but is being tackled with success at Papworth, Nayland, and other institutions. The establishment of a campaign, comparable to the Framingham Drive in the United States, is an experiment worthy of being applied to this country.

Dr. H. BATTY SHAW (London) considered two measures of supreme importance in dealing with tuberculosis: (1) the sterilisation of milk, and (2) segregation of patients, and the removal of children from the source of infection, as there is no evidence that adults, officers of institutions, and so on, take the disease. Segregation of those suffering from tuberculosis is not at all so impracticable a measure as it would seem to be. In any case unless the disease be controlled by the measures indicated all other procedure is useless. The "impure" case of tuberculosis—i.e., tuberculosis in association with other diseases of the lungs—is the dangerous one. Accompanying pneumonia and cavity formation are due to a "mixed infection," and it is impossible to produce these in animals by injection of the tubercle bacillus alone. In a word, tuberculosis of the lungs is really a dual disease, and the term consumption or phthisis should be kept to describe these mixed infections.

Dr. G. B. DIXON (Birmingham) stated that 55 per cent. of children at the age of 5 react to tuberculin and that a survey of 7000 cases in Birmingham gave proof that in a large proportion there were relatives who had either succumbed to the disease or were then suffering from it. Many factors in infection had to be considered. What, for example, are the conditions in infection which at one time will give rise to immunity and at another to serious illness or death? The most vulnerable period of life is the first decade. The measures to be adopted in attempting to control tuberculosis include the protection of the children, reference being made to the Grancher system and the difficulties attendant on its operation, the supervision of known sources of infection, education of the patient and those in association with him, and segregation as far as possible in the patient's own home. Two hundred sleeping shelters are provided to this end in Birmingham. The provision also of a larger number of beds in institutions would be of value, not alone from the nursing point of view, but also economically. Compulsory segregation, however, must be approached with diffidence, though the possession of powers towards this end would form a strong argument in favour of segregation in the patient's own interests.

Dr. J. E. CHAPMAN (London) directed attention to after-care machinery in the struggle against tuberculosis. The occurrence of tuberculosis in a working-class family, particularly if the patient is an adult, is frequently an economic disaster, and care committees, by attending to the economic problem in the cases of individual sufferers and their families, can assist very materially in rendering treatment effective, reducing the risk of relapse and minimising the danger of spread of infection. Unfortunately a variety of circumstances, particularly the war, have retarded the development of these committees. The aim of such a body should be to help the patient to help himself, to give material assistance with the greatest circumspection, and bring him into touch with all local and national agencies which may be able to meet his need. That the committee should have funds at its disposal is desirable but not essential. The unit with which the committee should deal should be the family and not the individual who is suffering from tuberculosis, and, lastly, action should be taken before the circumstances of the family have become disorganised—on the principle that prevention is better than cure.

Dr. C. MUTHU (Wells) thought the lack of knowledge with regard to tuberculosis was due to attention being concentrated on the microbe rather than on the man, and the problem is a social, economic, and industrial one. There is a positive correlation between the density of the population and the death-rate from tuberculosis, as was illustrated by figures drawn from London, Glasgow, Dundee, and other crowded centres of population. Thus, also, in India, crowded Bombay presents a higher death-rate than Bangalore, with its garden cities. Among Mahomedan women, secluded in ill-ventilated zenanas, the death-rate is nearly three times as high as amongst men. The more strictly the purdah system is observed the greater the mortality. The experience of the war has shown that when females are subjected to the same influence of occupation the mortality-rate rises as high as, or higher than, the male rate. Tuberculosis is a symptom of poverty, which, with its concomitants of overcrowding and insanitation, undermine the stamina of people so that they fall ready victims to disease. Kaiserling regards tuberculosis as primarily not an infectious disease, but as a disease of nutrition. The soil is more important than the seed, and in India, where tuberculosis amongst cattle is very rarely met with and little or no cow's milk is drunk, nevertheless the disease is very prevalent. Therefore, it is not so much by destroying infection as by

attacking social evils, raising the standard of living and thus increasing resistance, that we may hope to eradicate tuberculosis.

Dr. VERE PEARSON adverted to the unsatisfactory position in regard to notification which was not fully utilised—e.g., in the examination of contacts and for demographical purposes. Routine measures of disinfection are futile—soap and water, fresh air and sunshine are more important than mere disinfection. Training in the early diagnosis of tuberculosis is improving though still sadly defective, and there is only one institution in the country devoted to research into the early symptoms of disease, the Clinical Institute at St. Andrews under Sir James Mackenzie.

Dr. LILLINGSTON pointed out, with reference to a statement made by another speaker, that though the death-rate in New York from phthisis has fallen 50 per cent., that from heart disease has gone up 50 per cent. He suggested that heart disease has, perhaps, become a euphemism for tuberculosis.

Dr. A. NEVILLE COX (Brighton) asked if spitting is really a danger. The fact that in Brighton observation had shown that only a proportion of deaths from tuberculosis amongst children occurred in cases which had been in contact with open infection at home, argued that the children might well have become infected by playing about in the streets, the only nursery for many of them. Attention was drawn to the possible spread of infection by dogs and flies. Calling attention to certain legislative defects, he advocated the extension of the provisions of the Factory Acts to offices, &c., which, under the present conditions, are subject to no supervision.

Dr. J. A. WATT (Derby) was satisfied that on the whole the tuberculosis services act efficiently and quickly, though dispensaries, lacking X ray apparatus and other things, are not by any means properly equipped. So far as care committees were concerned he thought these should be self-contained and he objected to having to go to other organisations for funds.

Dr. R. ROBERTSON (Ventnor) considered that if an unlimited purse were at our disposal tuberculosis would soon be overcome. It should be a matter for the M.O.H. and the tuberculosis officer to evolve an ideal method of disinfection.

Dr. G. FLEMING (Farnham) pointed out that the fall in tuberculosis mortality as manifested by the graphs exhibited, began long before sanatoria and other similar measures for the treatment of the disease existed, and wondered, therefore, if the methods carried out in the last 30 years had been of real advantage in the treatment. Perhaps the advanced case was much less dangerous from the point of view of infection than the open case in an earlier stage and at work. Money would be spent with greater benefit by concentrating on the treatment of the earlier stages. After all, care committees are only doing what the State itself should do. The tuberculosis officer should be trained in general practice as well as in his special work and should make it his duty, either personally, or by his staff, to investigate the home conditions of every notified case.

Dr. T. E. WHITE (Catford) thought that to await the finding of tubercle bacilli in the sputum was too late and desired to know, therefore, when a case became notifiable. The doctor in attendance cannot always be held responsible for late notification.

Dr. MILLER, speaking as an M.O.H., considered the difficulty in regard to early notification could be got over if the general practitioner would only call in the tuberculosis officer more frequently.

The PRESIDENT, summing up the discussion, deplored the great lack of knowledge regarding the biology of the tubercle bacillus, nor will the disease be stamped out until we learn more concerning the production of immunity and the response made by the human subject to infection.

Dr. JANE WALKER replying, believed that we should have to come back to Koch's view that there was no danger at all in milk containing bovine tubercle bacilli, while the longer she lived the less she believed in measures of compulsion.

SECTION OF OPHTHALMOLOGY.

THURSDAY, JULY 26TH.

THE morning session was devoted to a discussion on the

Clinical Significance of Scotometry.

Sir JOHN PARSONS (London), President of the Section, having, in accordance with precedent, vacated the chair in favour of the Vice-president, Mr. RANSOM PICKARD (Exeter), the discussion was opened by Mr. A. H. H. SINCLAIR (Edinburgh), who showed an interesting series of charts obtained by Bjerrum's method. He pointed out that scotometry furnished a striking example of the help given in the early diagnosis of disease by the minute study of subjective symptoms. Bjerrum, of Copenhagen, had given us the most delicate and accurate method of estimating areas of relative failure of vision, especially in the more central part of the field. By diminishing the size of the test object used, and at the same time increasing the working distance to 2 metres, his method made it possible to demonstrate small areas of slightly depressed vision, which would otherwise escape notice. A practised and experienced observer could by this method demonstrate upon Bjerrum's screen the course of the large blood-vessels of the retina for some distance from the blind spot. Yet, when familiarity with the method had been gained, it had been found sufficiently rapid for use in out-patient work at Edinburgh. It should be remembered, Mr. Sinclair said, that the blind spot of Mariotte was normally surrounded by an amblyopic zone measuring about 1°; in many cases irregular projections of this zone, above and below, were found normally, which corresponded in position with the points where the large blood-vessels left the disc. One point of importance was the direction of movement of the test object; if moved from the blind to the seeing area, the scotoma would appear larger than if the reverse direction—moving the test object from the seeing area to the blind area—were adopted. It was usual to record the intermediate point between these two observations. A curious phenomenon occasionally observed under certain conditions was that a red object might appear green (its complemental colour) in the peripheral part of the field, but was recognised as red when brought nearer to the fixation point.

In tobacco amblyopia, failure of the light difference sense and paracentral scotoma were constantly present. The scotoma had the following characteristics: bilateral, irregularly oval in shape, extending from the blind spot to the fixation point, which it included, and presenting "areas of greater saturation or density." Debilitating conditions, such as influenza, overwork, diabetes, rendered a patient more susceptible to tobacco amblyopia. If a paracentral scotoma of the type described was met with in a smoker who was a diabetic he should always be advised to stop smoking. Tobacco amblyopia was uncommon in cigarette-smokers, but a chart was shown of a case due to smoking 25 cigarettes daily, with inhalation.

Another chart showed a central scotoma due to cocaine, where the habitual excessive use of cocaine sprayed into the nose had followed its use for some nasal condition. In disseminated sclerosis failure of vision is often an early symptom, and a central scotoma may be present without any contraction of the peripheral field. The most important characteristic of the scotoma in such cases was its tendency to change, to disappear, and reappear.

The early diagnosis of glaucoma had been greatly aided by scotometry. The old saying, "No scotoma, no glaucoma" was true as a general rule, though exceptions did occur. "Bjerrum's symptom,"

characteristic of glaucoma, might be stated as follows: "The area of normal or most fully preserved vision, as also the area of relative defect, are in contact with the blind spot, or may be said to meet at the blind spot of Mariotte." Or, in other words, "a peripheral area of relative defect can always be traced up to the blind spot provided a sufficiently small test object be employed, and the area of most fully preserved vision is always in contact with, but does not surround the blind spot." (Charts illustrating these points were shown.) In the vast majority of cases of glaucoma relative field changes appear early, and their recognition is of great importance. Mr. Sinclair said that the earliest changes found may be of three types: (1) shrinkage of the 1/2000 field; (2) expansion of the amblyopic zone round the blind spot of Mariotte, which may "break through" to become continuous with a more peripheral defective area; (3) arcuate scotomata, connected with the blind spot, or separate from it. The observer must not be misled by the normal projection of the amblyopic zone, due to the large blood-vessels, already referred to.

Retrobulbar neuritis with central scotoma may result from orbital disease or disease of the accessory nasal sinuses. When the optic nerve is involved, in the optic canal, from disease of the neighbouring sinus, central scotoma is an early symptom. In such a case the scotoma usually affected one eye only, appeared suddenly or developed rapidly, and might be pericentral, or paracentral including the blind spot. The amblyopic zone around the blind spot might be greatly extended. The negative characteristics of the scotoma in these cases were of importance; it had not the areas of saturation characteristic of tobacco, nor the quadrantic formation of a scotoma from a chiasmic lesion. Rhinological and X ray examination were required to locate the lesion of the nerve, which could not be determined from study of the scotoma alone.

Bitemporal hemianopsia occurred in typical form in connexion with tumours of the pituitary body. In some of these cases central vision was affected early, and a quadrantal scotoma could be demonstrated. Such cases tend to run a more rapid course than those in which central vision is not affected till the later stages. Mr. H. M. Traquair had described in detail the course of the development of this quadrantal defect, which was difficult to explain. In conclusion, Mr. Sinclair said that it must be remembered that the valuable evidence afforded by scotometry must always be considered, not by itself, but in association with the evidence from other modes of investigation.

Dr. M. GORDON HOLMES (London) emphasised the importance of personal factors in this class of work, both in the patient, and still more in the observer. The patient must be made to understand accurately what is required of him and, when once this is done, he should not be questioned during the examination, as his attention will be distracted if this is done. For the same reason all noise, all unnecessary movement, should be avoided. The noise made by most self-registering perimeters was a great objection to their use. More accurate results were obtained by objects moved by the observer's hand. It was important to make friends with your patient, to interest him in what was being done, and to avoid fatiguing his attention. Lastly, "the observer must be careful to maintain an attitude of intellectual honesty"—a difficult matter in a prolonged investigation. To this end it was best not to have before one the result of a former investigation.

Mr. MALCOLM L. HEPBURN (London) showed charts of fields and scotomata in cases of choroidal affections, including under this heading pigmentary degeneration of the retina. For this latter condition, "Raynaud's disease of the choroid" had been suggested as a suitable name. Observation of these cases had led to the conclusion that as long as there was any remainder, even if it were a comparatively small island, in the lower temporal field (usually the last to be lost) the patient would not suffer complete loss of central vision. These patients should be advised never to emigrate to a cold climate.

Mr. H. NEAME (London) showed a series of charts from a case of pituitary tumour, which illustrated in a striking way the variability of the scotoma—a point recently emphasised in De Schweinitz's Bowman lecture.

Mr. N. BISHOP HARMAN (London) called attention to the importance of rapid work. Bjerrum's method made great demands on time and patience. Movement should be from the blind to the seeing area. Speaking of tobacco amblyopia, he gave it as his impression that cases were far less numerous than formerly; also, that it was possible in these cases, by varying the amount of light, to get evidence of depression in the peripheral field.

Sir JOHN PARSONS emphasised the fact that an amblyopic zone round the blind spot is a perfectly normal phenomenon.

Mr. PICKARD showed charts of cases presenting unusual features difficult of explanation. The first series were cases of chronic glaucoma where the limitation of the field was concentric, and the blind spot showed little or no enlargement, central vision being normal. His impression was that in these cases the outlook was better than in cases showing marked enlargement of the blind spot. A second series of charts were shown from cases where a similar concentric limitation of the field was due to functional causes; in one of these some enlargement of the blind spot was present. These cases, taken together, illustrated the difficulty that confronts the ophthalmic surgeon in distinguishing between such functional cases and those of early glaucoma with little or no increase of tension. Other charts of atypical cases of glaucoma were shown. Attention was called to the fact that in two of these bacilluria was present. In his experience this was not infrequent, and was, in his opinion, a distinct factor in the causation of glaucoma.

Mr. SINCLAIR, replying on the discussion, said that relative defects in the field were apt to vary from time to time. Given an experienced observer, and an intelligent patient, work with Bjerrum's screen could be done quickly. In regard to tobacco amblyopia, he was of opinion that the peripheral field showed remarkable freedom from restriction.

Exhibition of Cases.

In the afternoon the members of this section visited the Portsmouth Eye and Ear Hospital, where, in addition to other cases of interest, Mr. W. S. INMAN showed a number of cases illustrating the close connexion between squint and emotional factors. Incidentally it was mentioned that there were no less than 1500 cases of squint among the children of the Portsmouth elementary schools. The cases demonstrated by Mr. Inman were selected as showing the liability of the squint to vary from day to day, and the presence, in their parents or other relatives, of such symptoms as stammering, left-handedness, and alopecia areata. A case was shown in which a transient nystagmus was produced by covering one eye. In other cases squint had either followed or disappeared after a fright or accident. Most of the cases selected for demonstration appeared to be of neurotic temperament. In the informal discussion of these cases it was pointed out that accurate statistical records would be necessary to place beyond doubt any direct causative connexion such as these cases suggested.

FRIDAY, JULY 27TH.

The morning was devoted to a discussion on

Ophthalmology in Relation to the Navy, Army and Air Force.

Sir JOHN PARSONS took the chair, and special prominence was given to the problems arising in connexion with the Air Force.

Air-Commodore D. MUNRO said they had come to regard inequality of the eyes as dangerous. This was probably also a cause of failure to excel in such games as golf. Most people had "a master eye"; if this was so, it implied that the other eye "lagged

behind." One eye began by being the better of the two, and the other eye got careless, and neglected. Apart from refraction, a possible explanation was that one eye was better supplied with rods and cones than its fellow, or the visual cortex on one side was better supplied with pyramidal cells than on the other side. Heterophoria, in the Air Force, had come to correlate something more than imperfect muscle balance. It implied bilateral disharmony: the brain was striving to fuse into one two pictures, of which one was better than the other and contained more detail. Their aim was not only to train binocular fusion but also to train the worse eye. "A man with only one eye is, to us, less dangerous than a man with two useful eyes with marked inequality between the two." A one-eyed pilot has his own ways of judging distances, for example, by movements of the head, so as to get an observation from two slightly different angles. Two of the best pilots he knew were practically one-eyed men. To Clements was due the credit of bringing to their notice the importance of orthophoria. Training based on this view had given encouraging results. A striking series of cases of "bad landers" had been improved. In some cases the improvement was so great that the men had later been singled out on account of their special aptitude. The effect of glare in aggravating these defects was of great importance. It led to fatigue of the accommodation, interfering with accommodation and convergence, and aggravating any imbalance of the ocular muscles.

Wing-Comdr. E. C. CLEMENTS detailed the steps by which he had arrived at his present conclusions and methods. Before the war he had become interested in a special group of cases, complaining persistently of asthenopia, in spite of repeated changes of glasses. In this group he was impressed by the large proportion of engineers' draughtsmen, men whose work involved frequent use of a sliding rule. Some of these men had automatically got into the habit of closing one eye, finding that they could work better in that way. Later on, in the war, men in the Air Force were sent to him because they could not land properly. When allowed to investigate, he made the startling discovery that about 80 per cent. of all "crashes" at a teaching aerodrome were due to bad landings. An independent investigator estimated the percentage at 70 per cent. On examining these men he was struck with the resemblance to the group of cases first mentioned. All the cases showed evidence of imbalance, and some cases also of suppression. Whereas some six hours in the air, training with an instructor, was found ample for most pilots to enable them to go "solo," many of these "bad-landers" had had about twice as long air training, without reaching such proficiency. "We have to consider a man in the air and not on the ground. It is a totally different problem. From infancy upwards, you have made all your judgments standing on the ground."

In the air unknown quantities complicated the problem. You did not know your distance from the ground. You were a moving object: you were not in contact with the ground. Centrifugal force sometimes complicated matters. For example, in doing a quick "spin" in the air, the eyes tended to be pulled out of their sockets, and, on coming out of the spin, the effect of centrifugal force would take a little time to pass off and allow the ocular muscle balance to recover itself. It was quite possible for a man to fly northwards into a cloud, and to come out of it flying southwards, and head-downwards, without knowing it. To those who did not agree with him as to the importance of heterophoria he would say: "Then let us call this important factor, whatever it is, x, and study facts." The clinical fact was that after the training adopted many bad landers had become safe and efficient pilots.

Speaking of the methods of examination followed, the pencil test was used for convergence, bringing it gradually nearer till one eye began to wander away: if this happened at a distance of less than two inches, convergence was considered very good: if beyond four inches, poor; from two to three inches, good. With this test they found three things might happen: one eye might wander out; or both eyes might swing outwards together, or the patient would get a feeling of pain and resistance, and draw back his head. The possession of considerable reserve power of convergence was desirable, whatever the explanation might be. The red-green test was used for measuring deviations. In exophoria and esophoria, $2\frac{1}{2}°$ of the one and $1\frac{1}{2}°$ of the other were regarded as unsatisfactory. If only one "omnibus" test were available, he would prefer Bishop Harman's movable diaphragm test. In regard to training, the first point was the breaking down of bad habits, and then setting up the good habit. It was no good giving a man an amblyoscope or stereoscope to take home for a week and then to come back and report progress. Daily supervision of these men was necessary, otherwise they were liable to fall into wrong methods in their endeavours to improve. Similar training would in his opinion benefit certain cases in civilian practice.

General Sir W. G. MACPHERSON was invited by the President to open the discussion on behalf of the Army, and gave a brief sketch of the way ophthalmic questions had been dealt with, from the old days when it was enough if a recruit could see the bull's-eye on the target at 600 yards up to the present day. In regard to ophthalmology the Army had not gone into it in the same way as the Air Force had done.

Major J. H. GURLEY, dealing with visual standards required of recruits, pointed out the waste of money consequent on an unsatisfactory standard; an ill-chosen standard led to numbers of men being discharged from the Army some months after enlistment, on account of inefficient vision, and their period of abortive training cost the country roughly 10s. per day for each man. In his opinion the 1920 standard was the best, leading to the smallest wastage of this kind; it was 6/18 in each eye, capable of improvement to 6/12, 6/6 with glasses. Unfortunately, it had had to be relaxed, as too few men were offering for enlistment.

Mr. RANSOM PICKARD referred to the question of night-blindness, and the bearing of hypermetropia and eyestrain on it.

Surg.-Comdr. W. K. D. BRETON spoke of the tests employed for gunlayers in the Navy; muscle imbalance of 2° led to rejection. He had refracted under a mydriatic a number of cases of men unable to read 6/4 partly, and found in most of them slight cylindrical defects.

Major M. W. B. OLIVER said night-blindness had been one of the commonest causes of malingering in the war, after it had become known that men were discharged on account of it. There was great scope for investigation of this subject with a view to providing some satisfactory test. In the war men had been sent into the front line, who were useless and dangerous to others, if their glasses got lost or broken. Protection of the eyes was a question that would have to be dealt with in the future. Triplex glasses might prevent many cases of injury to the eyes from splinters.

Mr. BISHOP HARMAN (London) referring to imbalance, described a personal experience of a hyperphoria of 2° becoming evident in consequence of digestive trouble.

Mr. E. E. MADDOX (Bournemouth) emphasised the importance of a sound nervous system in connexion with the cases under discussion; "mental coolness and freedom from mental flutter" were requisite. Abdominal disturbances certainly might influence muscle balance. During an attack of intestinal irritation his own physiological exophoria was changed to esophoria; worms in children produced at times a similar effect; in both instances a severe centripetal impulse was operative. He was in agreement with the figures quoted by Mr. Clements in regard to convergence. The question was not so much whether a man was able to converge his eyes, but of the delicate judgment of the amount of convergence exercised, and the inference from this as to distance. A number

of other factors came into play, for instance the apparent expansion of objects in size as you get nearer to them.

Squadron-Leader J. F. CARRUTHERS spoke of the advantage it had been to work with Clements at Hampstead for four months. He had been astonished at the way in which cadets who had crashed over and over again, and broken several aeroplanes, became safe pilots. Facts like that could not be got over however much they might differ on questions of theory. He strongly urged Mr. Clements to publish his unique observations and experiences of the last few years.

Major WRIGHT from his experience in India doubted whether glare was so important a factor as had been stated.

Sir JOHN PARSONS spoke of the complexity of the problem and the extraordinary value of research, as illustrated by Mr. Clements's paper. Once research was begun new problems continually presented themselves. Such a simple question as the relation of visual acuity to musketry had never been adequately investigated. It was a fortunate thing for ophthalmology that the investigations begun in the Air Force in the war had not been stopped by the powers that be. Mr. Clements had touched the crux of the matter when he said that we were accustomed to walk about on land, and flying presented totally different problems. Expensive machines and still more expensive lives were affected by the outcome of these investigations. He differed on some points from Mr. Clements, but the important point was that he had done most valuable work, carried out in a scientific way, and had set an example in regard to these problems that were arising. Splendid work had been done by the Industrial Fatigue Board and by the Institute of Industrial Psychology. The Government could find money and men to carry on these researches which they considered necessary for industry. Money should be available for investigations in the Navy and Army. The proper time for these investigations was in peace-time. When war came, men were asked to give an opinion when they had not always the proper data and material on which to base an opinion. We must emphasise to the Government the need of proper research being done in peace-time on these problems of the naval and military services. Our aim should be the setting up of a definite research department, financed and maintained by the Government.

Commander CLEMENTS, in reply, pointed out our ignorance of the essential nature of the fusion sense. He stated that in the construction of aeroplanes visual conditions had not been studied. Some aeroplanes were "blind-right" and some were "blind-left." A point of interest was that sometimes the red-green test would show esophoria, but, if you fatigued the patient, he would then show exophoria; this must mean that such a patient had a big reserve power and had got into the habit of over-correcting his defect. One remarkable thing in his experience had been the freedom from relapses.

A resolution was proposed by Sir JOHN PARSONS and seconded by Mr. A. C. ROPER (Exeter) recommending the Council of the British Medical Association to press strongly on the Government the great need for research. This was carried unanimously.

Major E. B. SPAETH, U.S. M.C., demonstrated a number of interesting diagrams, photographs, and drawings of plastic operations on the eyelids.

TUBERCULOUS CATTLE AND BLACK PUDDINGS.—Burnley Town Council, on August 29th, passed a resolution instructing their medical officer of health to report as to whether it was customary to allow the blood of tuberculous cattle to be used in the manufacture of black puddings, and what were the dangers of using the blood in this connexion. The Mayor, Dr. J. W. Clegg, said that out of 21,231 animals slaughtered last year only nine were affected and the carcasses destroyed. In the boiling of black puddings a longer time was taken and a greater heat generated than was necessary to kill the germs of tuberculosis. The danger from contamination was practically non-existent.

Reviews and Notices of Books.

A MANUAL OF HISTOLOGY.

By V. H. MOTTRAM, Professor of Physiology in the University of London. London: Methuen and Co. 1923. With 224 figures. Pp. 294. 14s.

THIS book is meant to be the companion of the student of physiology while he works through his first elementary course in microscopical anatomy. It should admirably serve its purpose. It is in no sense a book of reference, but it ought to be of real help in enabling the young to get what they so often miss—a sound dependable acquaintance with the commonplace and ordinary elements of the subject. As the author says, his design has been to make a book on histology with diagrams which he could set before a student who asked what to look for under the microscope, and his simple line drawings printed in the text will really help the beginner towards reality better than more elaborate pictures or half-tone reproductions of microphotographs. We may confess that we had not realised that any book could be better calculated to guide first footsteps than Sir Sharpey Schafer's great classic. The difference seems to be that the "Essentials of Histology" is at once an elementary manual of instruction and a book of reference which may be relied on throughout a man's career; Prof. Mottram does not attempt to satisfy the latter requirement, and in consequence makes a better job of the former need. There are a few mistakes: the ratio of red cells to leucocytes in the blood is 500, not 50 (p. 85); malaria does not cause an eosinophilia, and the "mast cells" of the rat's connective tissue are very doubtfully homologous with the "mast cells" of human blood (p. 83).

The only serious criticism which we would make is of the publishers rather than the author. The volume is much too big and clumsy, being printed on thick, soft paper in type unnecessarily large and with considerable margins. It is of the utmost importance that a manual for laboratory use should be easy to carry about; if it is not, the student will leave it in his drawer instead of putting it in his pocket to look at on the way home. Producing a book in a form in which it "would be an ornament to any gentleman's library" may promote the sale of collected editions of standard authors, but it is the last thing that is wanted in books of daily utility. The price of the present volume is, as such things go nowadays, not unreasonable; students of physiology are not so stupid as to pay it any more readily for a large and inconvenient piece of apparatus than for a handy useful companion.

EPIDEMIOLOGY AND PUBLIC HEALTH.

By VICTOR C. VAUGHAN, M.D., LL.D., Emeritus Professor of Hygiene in the University of Michigan. London: Henry Kimpton. 1923. In three volumes. £6 15s. Vol. II.

IN this second volume of Prof. Vaughan's work an attempt has been made to group the diseases according to the avenues through which the virus reaches and infects the body; it is, as the author says, only partially successful, as some epidemic diseases have no specific virus and others have multiple avenues of infection. The first group—Nutritional Disorders—includes the definite deficiency diseases, scurvy and beri-beri, and others, the classification of which is still doubtful, such as rickets, pellagra, and goitre. The second group—Alimentary Infections—includes all forms of food poisoning, botulism, the typhoid fevers, cholera, the dysenteries, sprue, Malta fever, and various animal parasitic infections. The third group—Percutaneous Infections—takes in malaria, yellow fever, dengue, tetanus, plague, typhus fever, the relapsing fevers, anthrax, rabies, rat-bite and snake-bite fever, the trypanosomiases, framboesia, the kala-azars, &c. A very full and interesting history of each disease is given, together with the various

opinions which have been held at different times as to its ætiology. Many quotations are offered from various authorities on each disease, but unfortunately these quotations are usually undated. This defect may generally be made good by consultation of the bibliography at the end of the chapter, but is rather an important omission in the case of diseases with regard to which views of individuals are changing almost from day to day. For example, McCarrison is credited with the belief that endemic goitre is due to a living organism, and a detailed statement of his argument and an undated quotation are given in support of this belief. It is probable that McCarrison now attributes much more importance to the iodine factor. The chapter on rickets is not as full as some of the others. One of the recommendations for the prevention of rickets—"The child should be kept in the open air with free exposure of the greatest possible extent of its body to the direct action of sunlight for at least three hours a day in order to facilitate the digestion and absorption of food"—suggests a more obliging sun and a better tackled smoke problem than we can boast of in this country. The chapters on malaria and yellow fever are, as was to be expected, especially interesting.

This work is a careful and painstaking effort to bring our knowledge of these diseases up to date, and we can cordially recommend it as a useful book of reference and a valuable addition to the library of any medical man.

SOCIAL MEDICINE.

Les médicins sociologues et hommes d'état. By P. TRISCA. Paris: Felix Alcan. 1923. Pp. 224. Fr.10.

THE gist of this interesting little book is that the evils from which the world is suffering might be greatly lessened if medical men set themselves to impress upon governments that the crying need is for public health in the widest sense—not only the prevention of zymotic diseases, but the regulation or abolition of drunkenness, syphilis, and tuberculosis, together with provision for healthy housing. Dr. Trisca sets a high standard for medical men—they should be strict abstainers and should never smoke; the end of the medical profession should not be money-making. This may be ideal, but yet medical men must live, and Dr. Trisca does not clearly explain how it is to be brought about. The first portion of the book is mainly taken up with short biographies of various medical men in different countries who have interested themselves in social matters or who have sat in Parliament, and the author casts his net wide, for he includes Darwin, Locke, Rabelais, and Quesnay.

We wonder a little that he has not mentioned Renaudot, who in 1631 started the first French newspaper, the *Gazette de France*. Renaudot practised in Paris and was the originator of the Monts-de-Piété, where the poor could obtain small loans on small security, and also of intelligence offices where they could obtain advice on medical and allied matters.

Though Dr. Trisca's maxims are counsels of perfection, he has certainly set an ideal which it would be well to follow.

LOEB CLASSICAL LIBRARY.

Hippocrates. Vol. I. With an English Translation by W. H. S. JONES. London: Heinemann. 1923. Pp. 362. 10*s*.

THIS volume contains the following Hippocratic treatises: Ancient Medicine; Airs, Waters, Places; Epidemics I. and III.; The Oath; Precepts; Nutriment. The selection, says the translator, "is intended to be typical of the whole Hippocratic *Corpus;* in it are included works belonging to the chief classes of which the collection is composed." Of these, the two last, though included in the Corpus, are almost certainly not genuine works of Hippocrates—i.e., of the author of Aphorisms, Epidemics I. and III. and of Airs, Waters, Places. In addition to his translation Mr. Jones supplies a most interesting introduction dealing with the Hippocratic collection in general and with the meanings of various medical terms. There is also a separate introduction to each individual treatise and in particular that to Airs, Waters, Places gives a clear account of the meaning of the terms heliacal, cosmical, and acronycal, as applied to the rising and setting of stars or groups of stars for the purpose of identifying the beginnings and ends of the seasons. We are glad to find this explanation, for many editions of the classics never give it—for instance, hardly any school edition of the Georgics does. An honourable exception to the general neglect is Prof. A. W. Mair's translation of Hesiod. Unless the reader is acquainted with the technical meanings of the terms "rising" and "setting" a passage such as this from Airs, Waters, Places XI. is meaningless: "One must also guard against the risings of the stars, especially of the Dog Star, then of Arcturus, and also of the setting of the Pleiades."

It is no doubt difficult for a busy medical man to find time to read Hippocrates, but if he should be able to do so, he will find no better translation than the volume before us. We look with interest to the coming of the remaining volumes.

BUGS.

A Biology of the British Hemiptera-Heteroptera. By EDWARD A. BUTLER, B.A., B.Sc., F.E.S. London: H. F. and G. Witherby. 1923. Pp. viii. and 682. £3 3*s*.

THIS handsome volume contains a very full account of the life-histories, so far as they are known, of the species of the suborder of Hemiptera-Heteroptera, or typical bugs, that are found in Britain, and in each case the life-history includes, as far as possible, not only the manner of life and the distribution and seasonal prevalence of the adult, but also corresponding particulars of the larval stages, and necessary details regarding the egg.

In excluding taxonomy and generic and specific diagnoses the author has impaired the usefulness of his work. His statement that the beak of bugs is used as a piercing organ is too general; the beak is not so used by the bed-bug, but is arched backwards to give exclusive play to the slender suctorial tube formed by the mandibles and maxillæ. In his account of the organs of Berlese and Ribaga—those curious structures peculiar, so far as is known, to females of the bed-bug—he has unfortunately overlooked the extraordinarily interesting work of Major F. W. Cragg—work full of suggestion equally to the biologist, the physiologist, and the pathologist. Cragg has shown that these organs, though distant from the genital apparatus and not possessing any obvious ducts, receive the exuberant spermatozoa from the male and filter them into the body cavity of the female insect; that the spermatozoa pass from the body cavity into the spermathecal chambers through the walls of the latter, and that they pass on to the ovaries not in the lumen of the oviduct but in the substance of its wall. Apparently only a small number of the spermatozoa reach the ovary, and the great mass of them are destined for some work other than fertilisation of ova. The author merely repeats Berlese's opinion that the organ bearing his name appears to ingest and destroy the excess of spermatozoa, although the evidence of Cragg's observations was published, in 1920, in the *Indian Journal of Medical Research*, and was demonstrated in London in 1922.

The book is a useful introduction, though without any such express intention, to a group of insects that is full of interest to the medical profession. For the facts that the bed-bug is a potential agent for the transmission of disease to man, and indeed in the case of kala-azar is reasonably suspected of operating effectively in such transmission, and that certain reduviid bugs are demonstrated intermediaries in the propagation of Chagas's trypanosomiasis in South America, bring the suborder definitely within the domain of medicine. The facts, again, that several species of bugs are copiously infected with flagellate protozoa akin to certain common and

disastrous blood parasites of man in tropical countries, and that some of these bugs are known to owe their infection to plants, like spurges and dog-banes, that have a milky sap, invest this suborder with an interest which, though at present predominantly speculative, is seriously attractive to the pathologist. Furthermore, to the student of parasitology a group of insects that provides such an easy supply of flagellate protozoa for experimental work should be particularly alluring.

EARLY DIAGNOSIS OF THE ACUTE ABDOMEN.

Second edition. By ZACHARY COPE, B.A., M.D., M.S. Lond., F.R.C.S. Eng., Surgeon to Outpatients, St. Mary's Hospital, Paddington; Senior Surgeon to the Bolingbroke Hospital, Wandsworth Common; late Hunterian Professor, Royal College of Surgeons. Oxford Medical Publications. London: Henry Frowde and Hodder and Stoughton. 1923. Pp. 223. 12*s.* 6*d.*

IN this second edition of a valuable little work few changes have been made, but they considerably enhance its practical usefulness. The general arrangement of the work is unaltered. It is of interest to note that the author lays stress upon a fact which is often overlooked—namely, that free fluid within the peritoneal cavity may be simulated by dilated coils of intestine which will not only give dullness in the flanks but a dullness which shifts with the position of the patient. Important changes have been made in the description of the areas of superficial tenderness which may be met with in cases of appendicitis, and the author's account is now more in conformity with that usually given. The method of estimating the area of hyperæsthesia by means of a dragged pin is now advocated in preference to pinching a fold of skin. The area in which such hyperæsthesia is found is one lying parallel to the right Poupart's ligament and just above it and is dependent upon the distension of the viscus. Sufficient stress is hardly laid upon the fact that the sudden disappearance of this area of hyperæsthesia is one of the earliest signs of perforation of the appendix. Although attention is directed to the importance of early diagnosis of perforated gastric or duodenal ulcer that group of cases in which the onset is gradual and where the patient may walk up for advice is not given much prominence. In such cases the pulse may be only 60 and the patient may show no signs of primary shock, although there is already much rigidity of the rectus.

The book is an extremely valuable guide to all holding positions as house surgeon or who have recently entered general practice. As such it has evidently enjoyed a popularity which the present edition will increase.

BLOOD AND BLOOD DISEASES.

Blutkrankheiten und Blutdiagnostik. Von Dr. Med. OTTO NAEGELI, Professor der Inneren Medizin an der Universität Zürich. Vierte Auflage. Berlin: Julius Springer. 1923. With 25 coloured plates. Pp. 587. £1 5*s.*

Prof. Naegeli's book requires no introduction to hæmatologists in this country; since the appearance of the first edition it has remained one of the most useful works of reference extant on blood and blood diseases, and this, the fourth edition, will serve to confirm it in its place. Notice has been taken of most recent work of importance on the subject, and several new sections and many illustrations have been added.

Of the new matter contained in this edition some of the most interesting is that in the section on the Hæmorrhagic Diathesis, under which head the author groups together all conditions in which purpuric manifestations play a part; this results in bringing some very diverse conditions into juxtaposition, and since a few glimmerings of light have of late years been thrown on some of the underlying causes of the various conditions described, it is questionable if this arrangement is now quite justifiable. It is not conducive to any true understanding of the matter to find Goldmann's Hereditary Hæmorrhagic Telangiectases standing at the head of a list which includes also Avitamosis, Anaphylaxis, and Hæmophilia. In this section, however, Prof. Naegeli does good service in calling attention to the importance of the blood platelets in purpuric conditions; in those associated with a withdrawal of these bodies he makes a sharp distinction between "benign" or idiopathic forms and those secondary to an infective process which he calls "malignant"; to the former he would apparently limit the term "Werlhof's disease"; the latter he regards as examples of the "aleukia" of Frank. The blood platelets in fact receive throughout a consideration from Prof. Naegeli in pleasing contrast to their treatment by many authors in this country. The choice of the dry-slide method of Fonio for counting them, however, was not fortunate; whatever may be said as to the relative accuracy of the methods, the wet method is far easier to carry out. The 25 plates in colour at the end of the book are a valuable feature; their subjects are happily chosen; the original drawings by R. Sarno of Naples were evidently well done and their reproduction is pleasing. The book contains a voluminous and useful bibliography.

THE PERIODONTAL TISSUES.

Lectures on the Diseases of the Periodontal Tissues due to Infection in their Relation to Toxæmia. By J. H. MUMMERY, J. G. TURNER, Sir WILLIAM WILLCOX, and Prof. E. E. GLYNN. London: Dental Board of the United Kingdom. 1923. Pp. 96. 2*s.* 6*d.*

THE Dental Board has done well to publish the four lectures on periodontal disease which were delivered at various centres during the earlier part of the year. They contain matter of great interest, much of which does not find any place in the various text-books. There is a special significance attaching to the appearance of this book, for it represents the beginning of post-registration teaching carried out as a part of the duties of the official body which controls the dental profession. Though this book does not pretend to be a complete manual on pyorrhœa, yet within a space of less than 100 pages it covers a very wide field. The patho-histology is dealt with by Mr. Mummery in a comprehensive manner. Mr. Turner contributes the lecture on the local clinical symptoms, which in the extent and accuracy of its observations could hardly be bettered. The systemic effects are discussed by Sir William Willcox on the lines made familiar by previous contributions from this writer. The bacteriology of pyorrhœa is dealt with by Prof. Glynn. Of all aspects of pyorrhœa this is, perhaps, the most confusing. Though Prof. Glynn cannot assign any specific organism to this disease his chapter is a masterly review of the subject. It is no disparagement to the other writers to say that this chapter is the most notable feature of the book, which would be well worth buying on its account alone.

Since pyorrhœa plays a not unimportant part in general medicine, this volume may be commended to both medical and dental practitioners as a sound and comprehensive review of the present state of our knowledge of pyorrhœa.

THE SECRET JOURNAL OF CHARLES DUNBAR.

By J. MACONECHY. Collins. Vi. + 276 pp. 7*s.* 6*d.*

AN instance of hereditary ability marks the authorship of this recently issued novel. It depicts the life of a country parson and his conscientious endeavours to perform the duties of his profession, though realising the limitations of his religious convictions and belief; a position which appeals to many outside the clerical circle, and in particular to men of science. The book relies upon the study of character, rather than plot, for its interest, and should recommend itself to the medical profession as the work of a direct descendant of the sister of William and John Hunter.

THE LANCET.

LONDON: SATURDAY, SEPTEMBER 8, 1923.

THE EARTHQUAKE IN JAPAN.

THE appalling disaster which befell the middle island of Japan last Saturday has evoked the active sympathy of the civilised world. The disaster was not without precedent or altogether unexpected. There is a yearly average of 96 perceptible shocks in Tokio, and every Japanese boy or girl is brought up to expect one severe earthquake in his or her lifetime. It was after the last severe quake in Tokio that the seismographic station was opened which has added so much to our knowledge of movements in the earth's crust, but shock followed shock so rapidly on Saturday that the instruments can only have recorded their own destruction. Position on a low seaboard still further imperils Japanese cities, situated, as they already are, on a direct line of stress, the result of a specially sharp fold in the earth's crust; for, just as in Calabria, at San Francisco, and on the Mexican seaboard, shock was followed by fire, and fire by tidal wave. The great Indian earthquake of 1897 which crossed a continent would have produced fearful devastation had not the country traversed been wild and sparsely populated. We may trust that the high level of civilisation was sufficient to prevent the mad orgy of riot and rapine which has followed on such catastrophes under less favourable circumstances, for the rapid development of Japanese culture has hardly been less astonishing than the local changes in the earth's crust which caused the disaster. Immunity from considerable vibration during recent years had made experts apprehensive that seismic disturbance, when it should reappear, might be of special severity.

The Eastern island empire stands in special relation medically to our own, for it is one of the two countries, Italy being the other, with which complete medical reciprocity has been established, and reference to the foreign section of the Medical Register shows the extent to which advantage has been taken of this mutual concession. During the last few years a number of important scientific announcements have originated from Japanese universities, which are both numerous and well equipped; reminder is scarcely needed in regard to the pioneer work on experimental tar cancer of YAMAGIWA, ICHIKAWA, and TSUTSUI, and the discovery, after much painstaking research, of the spirochæte of infectious jaundice, associated with the names of INADA, IDO, HOKI, KANEKO, and ITO. We have received only this week the first imposing volume of a series of scientific reports from the Government Institute for Infectious Diseases at the Tokio Imperial University, of which Prof. MATARO NAGAYO is director. This work, which has already appeared in the *Japanese Journal of Experimental Medicine*, is now made accessible for the common stock of medical knowledge by the decision of the Institute to publish an account of all research in some European language; and a large part of this admirably printed and illustrated volume is in English. We have yet to learn whether the disaster will be a serious setback to scientific work in Tokio, nor do we yet know to what extent the scientific workers have perished with their universities and institutes, but the motto of those who survive will, we feel sure, be that of Italy after the Calabrian disaster, when Sign. MARCORA quoted, amidst the applause of the Italian deputies, the words "Post fata resurgo." In the present case, should rehabilitation be required, medical and scientific friends in this country will gladly render any aid at their disposal.

PASTEURISED MILK.

THE prime importance of milk as a food has been emphasised of late by the exponents of what is known as the "newer nutrition," while medical officers of health, on the other hand, have not ceased to put prominently before the public the dangers of a contaminated milk-supply. It is not surprising, therefore, that discussions as to the best policy to adopt for the purpose of obtaining a safe milk-supply have occupied a large part of the time of recent sanitary congresses. At the National Milk Conference held at the Guildhall last year there were doughty protagonists of clean raw milk from tuberculin-tested herds and of adequately pasteurised milk, while perhaps the surprise of the conference was the general endorsement by leading medical authorities of the value of a third form of safe milk, which did not appear on the programme—namely, dried milk. The National Clean Milk Society has convened a further conference at the Guildhall in November next to consider pasteurisation. The appearance is therefore opportune of a report on the Pasteurisation of Milk by Dr. J. M. HAMILL, a medical officer of the Ministry of Health. This report, of which a summary was given in THE LANCET of August 18th (p. 338), puts the case clearly and reasonably for pasteurisation as defined by the new regulations—that is to say, milk which has been exposed once for 30 minutes to a temperature between 145–150° F. (63–66° C.). Milk so treated is rendered reasonably safe as regards the risk of transmitting disease; the pathogenic organisms liable to be found in milk are, with the exception of the tubercle bacillus, killed by the process, and that organism, if not killed, appears to be so attenuated as to become harmless. This appears from the results of an important and laborious investigation by Dr. F. W. CAMPBELL BROWN, printed in the same issue, which may be regarded as settling once for all the thermal death-point of the tubercle bacillus in milk. The difficulty of striking the happy point where sterilisation is sufficient and heat deterioration has not set in is also manifest in the report on condensed milk, which is summarised in another column. In many cases a few spores remain without doing harm.

The effect of pasteurisation on the chemical and physical characters of milk must also be considered. Taste and flavour are scarcely altered. At 145° F. (62·8° C.) the separation of cream is affected but little; at 148° F. (64·4° C.), however, the cream line may be decreased by 40 per cent. This in itself is unimportant; in fact, one of the advantages of homogenised milk is that the cream will not separate. At 145° F. (62·8° C.) the milk proteins are unaltered, but at 150° F. (65·6° C.) 5 per cent. of the albumin is coagulated. There is no evidence that coagulated albumin in pasteurised or dried milk is more difficult to digest, just as there is no reason to suppose that the white of a raw egg is more digestible than the white of a boiled egg. The enzymes are slightly affected, but we do not know if that is a drawback. Junket can be made more easily from pasteurised milk. The

soluble calcium and magnesium phosphate are not precipitated. Vitamins A and B are probably not affected; vitamin C is partially destroyed. As the destruction of vitamin C is due to heat and oxidation combined, precautions to exclude air during the process are beneficial. These matters are still under investigation. Transport is still an unsolved problem; distribution even of clean tubercle-free milk gives opportunities for contamination with pathogenic organisms, but if milk is to reach everyone it must often travel long distances and be transportable. Pasteurisation helps to bring this valuable food within reach of town dwellers with its taste, flavour, and nutritive value practically unimpaired. After pasteurisation—and this cannot be too strongly insisted upon—it must be as carefully handled as clean raw milk. Dirty or stale milk if pasteurised will give a higher bacterial count than fresh clean milk pasteurised; nor will it even pay to pasteurise stale milk, as the flavour is not improved thereby.

Pasteurised milk agrees with children as well as raw milk, and the partial loss of vitamin C, whatever it may amount to, can readily be made good by giving orange or other fruit juice. The physical and chemical alterations resulting from pasteurisation are held by some to indicate the possibility of other nutritive changes of which we do not know and which may be important; such hypothetical considerations cannot be allowed to outweigh the important positive advantages accruing from pasteurisation. It seems to be peculiarly difficult to avoid prejudice in this matter of the heat treatment of milk. More than other European countries we have been accustomed to drink our milk raw—east of the Balkans uncurdled milk is not regarded as fit for human food—and the opponents of pasteurisation call in Nature as their witness. Cow's milk, however, is no more a natural food for man than is a hen's egg. Romulus and Remus obtained an unnatural food in a natural manner, sterile and at blood heat. We have to content ourselves with an unnatural food obtained in an unnatural manner and must call in science, not Nature, to our aid. The British farmer is even more afraid of science than the British manufacturer, and it would be a difficult feat for the scientific advisers of the Ministry of Agriculture to persuade the farmers of our western counties to adopt the practice of pasteurisation. The very word stinks of science. It so happens, however, that in these western counties it has been the practice for years to pasteurise such milk as is made into clotted cream or butter and to drink the "scald" milk, without anyone worrying as to whether the nutritive value of the cream, butter, or scald milk were thereby impaired. The old-fashioned Devonshire farmer would, in fact, regard his method of preparing cream and making butter as a "natural" process in strong contrast to the unholy scientific operations of the separator. We need to get rid of prejudice and patiently to apply our knowledge to make available for urbanised populations this valuable food which the forethought of our ancestors has gained for us.

PATHOLOGICAL DEPARTMENTS.

WE received lately a copy of the annual report of the pathological department of the University of Leeds which continues its prosperous career under Prof. M. J. STEWART. The staffing of the department has been much improved by the appointment of Dr. J. W. MCLEOD as first occupant of the chair of bacteriology, due to the munificence of Sir EDWARD BROTHERTON, and a considerable step in progress has been taken by the institution of a course in general bacteriology for science and technical students similar to that started in Manchester by Prof. W. W. C. TOPLEY. In this two of the liveliest of our modern universities are leading a substantial and much-needed reform of the state in which bacteriology was a wholly medical subject. But the appointment of Prof. MCLEOD as city bacteriologist raises other considerations. The diagnostic work of the department in 1922 involved the examination of nearly 18,000 specimens, of which only some 5000 (less than 30 per cent.) came from the General Infirmary, the balance representing public health material, especially from venereal diseases clinics, sent by various bodies, mostly the city of Leeds. The excuse for this utilisation of a department of a university, whose business is teaching and the advancement of learning, is doubtless to be found in the accounts, which show that 41 per cent. of the income of the department is derived from fees for diagnostic work. How far this diversion of the university's activities into money-making channels extends, we do not know, but it is fairly safe to assume that, for example, the department of mathematics is not called upon to earn money by doing actuarial work for insurance companies and commercial firms. But as far as pathological departments are concerned, the practice is unfortunately widely spread through the country. In weakening the ideals of higher education the effect is bad enough. It is also much to be deplored from the point of view of effective and progressive public health administration. The larger hospitals and medical schools have long since realised that they cannot hope to get the best—or, indeed, anything approaching the best—out of laboratory diagnosis unless they have their own laboratories in intimate contact, topographical and personal, with the clinical staff and the patients from whom the materials are derived; sending things down the road and having answers back on pieces of paper is by comparison no use at all. Similarly in public health work the city bacteriologist should be one of the right hands of the medical officer of health, and in continuous and immediate communication with him. Only in this way, we feel sure, can diagnostic bacteriology make its proper contribution to public health administration, and it is surprising that great and enterprising municipalities such as Leeds are content—if they really are content—to go on with a method so imperfect and makeshift. And when they have bacteriological laboratories of their own, professors of pathology will have no need to hold meetings, as described in the Leeds report, to chaffer with the Ministry of Health about the price they are prepared to accept for Wassermanns. As to Manchester the trenchant words of Dr. C. POWELL WHITE in our correspondence columns reflect the views at any rate of one section of pathologists on the need for a status independent of outside work.

THE RAPPROCHEMENT OF HOSPITALS AND CONTRIBUTORS.

THE year 1922 will be remembered as a year of depression, unemployment, and trade shortage in Sheffield as elsewhere; yet, for the first time for many years, the income of the local voluntary hospitals balanced their expenditure, and the accumulated debt due to the bank was reduced from £116,000 to £87,132. This happy result was achieved mainly by the efforts of the Sheffield Joint Hospitals Council, whose first annual report is of more than local interest. It takes

the form of an attractive book of 72 pages, of which tabulated statistics occupy only three, further information being presented with running comment. The right sort of notoriety has evidently been achieved—that which not only stimulates the interest of contributors in their hospitals but also brings them into touch with each other as a corporate body with a common aim. The secretary of the Council has met representatives of some 50 local societies and associations, and during the year there has been formed the Sheffield and District Association of Hospital Contributors, which has rendered valuable service in promoting the growth of the "1*d.* in the £" contributory scheme of employers and employees.

This scheme, which is described in a separate "Contributor's Handbook," is essentially an agreement to give, either by means of deductions from wages or directly, a penny for every pound of wages earned weekly to the Joint Hospitals Council. In return for such contributions free treatment and free maintenance is available on admission to any one of the five Sheffield hospitals, though contributors able to pay nursing home fees are requested not to avail themselves of these facilities. The success of the enterprise can hardly lie in this simple appeal alone, but is obviously due to the skill with which it has been organised, and the sympathy shown to the natural desire of the contributor, whether an individual or a firm, to receive some little recognition of his effort to support the hospital and some responsibility for its further maintenance. Such is afforded not only by the opportunity given to Works Hospital Committees to send delegates to the Association of Hospital Contributors, which in turn is adequately represented on the Joint Hospitals Council, but by the classified lists of contributing firms and individual contributors which form the largest part of the first annual report of the Council. The classifications are twofold—geographical, and according to trades—and friendly rivalry may thus be stimulated in at least two directions. Finally, a periodical news-sheet, in poster form, is published. The August issue gives notice of the next quarterly meeting of delegates, announces the programme of a series of free health lectures for the winter session, reports the advent of a new motor ambulance, and gives other information calculated to interest the contributing public.

We have set out the Sheffield plan in some detail because it is obvious that by this or similar means adopted in other industrial areas the voluntary hospital system can be saved. The days, however, when the hospitals could afford to stand detached and coldly solicit help by publication of figures showing huge deficits are gone. A more intimate relation between contributor and hospital boards has come to stay. Criticisms will arise, will be resented, and perhaps quashed, will be repeated, and—dare we say it—improvements in administration will ultimately result. Attention was recently called in our columns [1] to rigid rules in certain hospitals throughout the country limiting the use of the telephone, forbidding the introduction of fruit under any circumstances into the wards, and so forth; the quality and monotony of the full diet allowed to convalescents might also have been mentioned. It may well be that Associations of Hospital Contributors organised on the lines of the Sheffield and District Association will in the future find important work falling to their hands.

[1] THE LANCET, 1923, i., 1324.

Annotations.

"Ne quid nimis."

THE PREVENTION OF SIMPLE GOITRE.

THYROID enlargement is not the serious problem in this country that it is in Switzerland and some of the American States. This fact lends special interest to the account of an outbreak of acute goitre in a Lancashire children's home, recorded in our present issue. Dr. E. W. Adams and Dr. H. N. Crossley are not prepared to state whether goitre is or is not unduly prevalent around Rochdale, but they have no doubt that a high degree of thyroid instability is present among the children of the cottage homes in this area. It is hoped that further investigation may throw light on a very puzzling outbreak. It is endemic rather than epidemic goitre that has received most attention in recent times. In America an exhaustive study of the physiology and pathology of the thyroid gland, extending over some ten years, by Dr. David Marine and his collaborators, Drs. C. H. Lenhart, O. P. Kimball, and J. M. Rogoff,[1] has resulted in the development of a prophylactic scheme which deserves careful attention. Not long ago [2] we had occasion to discuss iodine prophylaxis with special reference to the problem in Switzerland, and concluded that the introduction of a small percentage of potassium iodide to the common salt in daily use would be a cheap and useful method. Although the ultimate cause of goitre is totally unknown, its immediate cause is claimed to lie in a lack of iodine, and the American authors support the view which is gaining ground that thyroid hyperplasia is a compensatory reaction arising in the course of a metabolic disturbance and immediately depending on a relative or an absolute deficiency of iodine. The prevention of human goitre on a large scale was begun in Cleveland in 1917, and the method adopted was the administration of 2 g. of sodium iodide in 0·2 g. doses daily for ten consecutive school days distributed over a period of two weeks and repeated each autumn and spring. This amount of iodine is admitted to be excessive, and beyond the ability of the thyroid to utilise and store. One gramme distributed over a longer period would be better; indeed, 3 to 5 mg. of iodine twice weekly over a period of a month, and repeated twice yearly, would amply suffice. Dr. R. Klinger, of Zurich, instead of sodium iodide, employs an organic iodide which is non-hygroscopic, very stable, practically tasteless—a vegetable fatty acid compound which is combined with chocolate and made into tablets, each containing 5 mg. of iodine. This method has been employed in all the schools in the cantons of St. Gallen, Berne, and Zurich with most striking results—e.g., incidence of goitre among all the school children in the Canton of St. Gallen: January, 1919, 87·6 per cent.; January, 1922, 13·1 per cent. The possibility of harm from a very small dosage used by the authors is negligible. A mild rash occurred in but 1 per 1000 of the cases treated, and in Switzerland not a single case of rash has been seen, nor has a case of exophthalmic goitre been produced. It comes to this—that if in endemic goitre districts every woman would keep her thyroid saturated with iodine during every pregnancy, she would not develop goitre, nor would there be any tendency toward goitre formation in the thyroid of the child. If every girl would keep her thyroid saturated with iodine during adolescence, that is from the age of 11 to 16 inclusive, none would develop goitre. A large majority of the goitres in boys are congenital, and could be prevented by the administration of iodine to the mother during pregnancy. In young individuals with thyroid enlargement of recent

[1] The Prevention of Simple Goitre. Compiled and edited by G. N. Stewart. Western Reserve University Bulletin, vol. xxvi., No. 7, July, 1923.

[2] THE LANCET, 1923, i., 660.

development the curative effects of iodine are very striking, and amount to complete relief. In long-standing goitre neither iodine nor desiccated thyroid are of much value in relieving the deformity. Thus prophylactic treatment is obviously the thing to aim at. As is pointed out in the *Bulletin*, the prevention of goitre is good preventive medicine; it is better preventive surgery.

PSYCHOPATHOLOGY AND THE PRACTITIONER.

IN the *Clinical Journal* of August 22nd Dr. W. H. Maxwell Telling, writing from the standpoint of a consulting physician, discusses the bearing of modern psychology on general practice. After outlining the theories of psychopathology and the scope of its clinical application, he leads up to the striking enunciation that it is the greatest remedial advance of modern medicine; from this arise some important questions. Though others may share in the preventive and educational applications of modern psychology, yet with us should rest its use in curative medicine. But he makes note—though the note is now losing its novelty—that nearly every practitioner faces the public totally unequipped in this most vital branch of medicine, and, as a correlated evil, that one sees young practitioners with an entirely insufficient post-graduate training in ordinary clinical medicine taking up psychopathology and mindful of little else. Dr. Telling's enumeration of the physical symptoms of disease which may have entirely or mainly psychical causes is, as he says, almost beyond credibility till one studies them from the new angle. His practical conclusion is that it does not follow that the treatment of all these cases can be carried out best in general practice, but they can there be sorted out and sent to the real source of cure rather than to the operating theatre, or the electrician, or allowed to drift to the "Christian Scientist" or the quack. The article is a forceful argument for regularising the position of psychopathology so as to ensure that the practitioner shall be enabled to recognise his cases and know which are within his powers of treatment and which are beyond, and, in the other direction, that the would-be psychopathologist shall go through the mill like other aspirants to the ranks of specialism.

SYPHILIS OF THE UTERUS AND ADNEXA.

Dr. Bernard Portis, of the Nelson Morris Memorial Institute for Medical Research, remarks[1] that syphilis of the uterus is a comparatively rare affection, apart from the primary lesion on the cervix, which is the commonest type of syphilitic involvement of the female internal reproductive organs. The frequency of cervical chancres varies according to different observers from 1·5 per cent. (Gellhorn and Ehrenfest) to 8 per cent. (Oppenheim), and 10 per cent. (Ozenne) of all primary lesions of the female genitalia. The paucity of symptoms and rapid repair without scar formation, as well as the fact that comparatively few examinations of the cervix are made in the early stages of syphilis, account for the discrepancy in these figures. According to Ozenne, the anterior lip is involved twice as frequently as the posterior, and in about half the cases both lips are affected. Multiple lesions have often been observed. The cervical chancre may assume either an erosive form or much less frequently an ulcerative form simulating carcinoma. Frank has shown that in the pregnant uterus the lesions may persist up to a period of five months and produce very extensive induration, which may prevent spontaneous delivery of the child. Secondary lesions of the cervix have been divided by Ozenne into erythematous, erosive, hypertrophic, papular, and ulcerative forms, of which the papular is the most frequent. Tertiary lesions of the cervix may assume a gummatous type, in which a diffuse infiltration involves the entire cervix, or a sclerotic type, which may develop on pre-existing primary, secondary, or tertiary lesions. The features common to all syphilitic lesions of the cervix are stated by Gellhorn and Ehrenfest to be as follows: (1) There is little secretion except in the tertiary ulcers or necrotic gummata; (2) there is little pain either spontaneously or resulting from direct trauma; (3) the lesions occur some distance from the external os, which is rarely the case in non-specific ulcers of the cervix; (4) the ulcers are usually covered with a film-like deposit which may be wiped off easily and exhibit a fatty lustre; (5) there is very little, if any, inflammatory reaction. In most of the reported cases of syphilis of the body of the uterus the evidence of the syphilitic nature of the process is inadequate. Primary and secondary syphilis of the body of the uterus has been rarely observed, probably owing to the fact that *Trep. pallidum* shows a predilection for squamous epithelium. Two main types of tertiary syphilis of the body of the uterus have been described by Ozenne: (1) The ulcerating gummatous type, which causes a marked increase in the size of the uterus; (2) the sclerotic type, in which the essential lesions are those of angiosclerosis and fibrosis of the myometrium. Adnexal lesions of which the syphilitic nature has been proven are even rarer than syphilis of the body of the uterus. Special interest therefore attaches to the case described by Dr. Portis, which occurred in a woman aged 38, in whom panhysterectomy was performed in the belief that the condition was carcinomatous. The syphilitic character of the process, however, was proved by histological examination, which showed a chronic diffuse interstitial endo-metritis, metritis, and perimetritis, with the specific organism in the cellular tissue separating the muscle bundles. The body of the uterus had probably become involved by direct interstitial invasion from a primary lesion on the cervix. Involvement of the adnexa was shown by a corpus luteum and the surrounding stroma of the ovary being the seat of lymphocytic infiltration in which a few treponemata were found.

[1] Surgery, Gynecology, and Obstetrics, July, 1923.

THE TUBERCULIN DISPENSARY FOR THE POOR.

A COMBATIVE and stimulating brochure[1] with this heading has recently been issued by Dr. W. Camac Wilkinson, who gives an account of the results obtained by his system of tuberculin treatment. The figures he publishes are instructive, and if certain other figures could be added our knowledge of tuberculin treatment would be not a little enriched. It appears that between 1910 and 1912 there were 107 sputum-positive cases treated at the Lambeth Tuberculin Dispensary. In 1920, 31 of these patients were still alive, 51 had died of tuberculosis and 25 were untraceable. Of the early and moderately advanced cases 68·5 per cent. were still alive, and Dr. Wilkinson compares these figures with those of the London County Medical Officer of Health, according to whom only 28 per cent. survived for four years. It would be interesting to learn whether these 107 sputum-positive patients were selected cases, or if every patient coming to the dispensary was given tuberculin treatment irrespective of the temperature. Again, with regard to the 25 untraceable cases, the question may be raised: Did some of the patients discontinue treatment with tuberculin because they thought it was doing them no good? At the end of his brochure Dr. Wilkinson publishes a short note by Dr. W. Stobie, according to whose statistics 429 cases of pulmonary tuberculosis were treated at Oxford, 83 being given tuberculin and 346 being treated without it. It appears from his table that only 5·2 per cent. of the patients not treated with tuberculin were still alive when this table was compiled, whereas 49·4 per cent. of the patients treated with tuberculin were still alive at the same period. At a casual glance this table suggests that the prognosis is many times better for patients treated with tuberculin than for patients not enjoying this remedy. But Dr. Stobie does not state the principles on which he selected his tuberculin cases. Did every fourth new patient receive tuberculin treatment, the order in which a new

[1] London: Nisbet and Co. 1923. Pp 67. 1s.

patient came to the dispensary being the sole factor determining the selection of controls? Or was the choice of tuberculin treatment determined by the temperature and physical signs? So long as information on these points is withheld, such tuberculin statistics as these are not calculated to impress anyone with more than an elementary knowledge of tuberculosis. Throughout Dr. Wilkinson's brochure there are complaints of the way in which his work has been investigated by the Medical Research Council. This investigation would appear from his account to have been most perfunctory, and if this is the case it is to be hoped that Dr. Wilkinson's work will be given fair judgment after a scrupulous and impartial investigation. He and his assistants have laboured in this particular field for many years, and whether their principles be sound or not, they have, at any rate, made out a case for further inquiries into the action of tuberculin.

THE EFFECT OF INDUSTRY UPON HEALTH.

INSURANCE companies in America have discovered that valuable information lies hidden in their records and are setting an example to other countries by instituting investigations and making the results known. One such review[1] deals with life and health among the wage-earning population of the United States and Canada in 1916–1920, including the end of the war period and the great influenza epidemic. The records of five great companies, which were pooled for the purpose, concern some 26,000,000 men, women, and children aged 1 and over—nearly one-quarter of the entire population of the United States and Canada. The mortality experienced is compared with that of the general population of the United States Registration Area; except that the proportion (46 per cent.) of insured persons under age 20 is greater than that (38 per cent.) of the general population, the age-distribution of the two is similar. The only other variant is that the insured population is composed nearly entirely of whites, while the general population contains a coloured element. One criticism—a serious one—must be made of this admirable study; "the statistics are not shown separately for the sexes because not all the companies had their exposures to risk classified on that basis." Since the mortalities of males and females differ so much, only regret can be expressed.

Some of the more interesting results of this great study may be briefly set out here. The total death-rates of industrial policy-holders throughout life exceeded that of the general population, the excess increasing with age; but over the five years reviewed there was a greater fall in mortality among the industrial population, 14·3 per cent. compared with 7 per cent., and in 1920 the mortality was only 6 per cent. above that of the general population. This result, due to decrease in tuberculosis, heart disease, chronic nephritis, and typhoid, is ascribed in part to better wage and living conditions during and immediately after the war. Tuberculosis in the insured group was less prevalent in childhood, but after age 15, particularly in the mid-period of life, was in excess of the general population. A decline (26·6 per cent.), greater than that (20·3 per cent.) for the general population, occurred in the five years, so that the gap between the two mortalities is being closed. An estimate is put forward that tuberculosis causes a loss in life expectancy of 3½ years for males and 2½ for women, or about 3 years for the two combined, and, further, that a year of life is worth $100 (£20 8*s.* 4*d.*) in net addition to national wealth. Hence tuberculosis is represented to cause a loss of half a billion dollars in the United States; on the same basis of calculation the economic loss in this country would be about £245,000,000 a year. The effect of the influenza epidemic of 1918 is of great interest; it is estimated quite fairly by taking influenza and pneumonia together as one mortality group. The age-distribution of the epidemic was entirely different from the normal for this mortality group which concerns early childhood, then passes at a low level through adolescence and adult life until it increases progressively in late middle life to old age. The great epidemic fastened upon ages 25–34, with ages 20–24 second and ages 35–44 third; upon childhood its inroad was comparatively moderate; in old age normal rates prevailed. This peculiarity is reminiscent of a similar, although less sudden, change in the age-distribution of phthisis during the war period which was manifested in different countries in proportion to their food needs. Probably the two diseases were manifesting a change in resisting power due to food shortage, which by 1918 was affecting even America. The better circumstanced policy-holders suffered least; the group of lives insured on intermediate plans showed a higher mortality; and the group insured on weekly premium plans had the highest rates. The heavier epidemic damage probably arose out of economic and social disabilities. When an alteration in age-distribution occurs, phthisis records teach that the normal is not readily regained, and the influenza-pneumonia records in 1919 and 1920 continue to exhibit a peak in mortality at ages 25–34.

The report rightly dwells upon the importance of organic heart disease, which affected the insured persons more than the general population to about the same extent as tuberculosis; but whereas the excess for tuberculosis is at its height at ages 35–44, that for heart disease has a crest at ages 15–19, which suggests an occupational influence for the former rather than the latter. Mortalities both for chronic nephritis and for cirrhosis of the liver were higher for insured persons, and the excess in each case was greatest at ages 35–44; both showed a great decline, that for nephritis 26 per cent. and that for cirrhosis 57·7 per cent., as compared with 20·7 per cent. and 45·6 per cent. for the general population; the downward trend for cirrhosis is ascribed to diminished use of alcoholic liquors and is regarded as evidence of the effects of prohibition. Typhoid fever, the best gauge of the progress of sanitation, was less prevalent among insured persons, and declined more (49·1 per cent.) than among the general population (42·6 per cent.). The report deals intensively with accidents, animadverting on the increase of automobile traumatism; and with puerperal mortality, wherein the data indicate that the recent rise is attributable entirely to accidents of pregnancy and "other accidents of labour," while puerperal septicæmia and intoxications of pregnancy have remained constant. These are all matters on which British insurance companies could, if they would, give comparable information.

[1] The Mortality Experience of Industrial Policy Holders, 1916–1920. Published by the Industrial Life Insurance Companies of America. New York. 1923. Pp. 150.

PASSIVE HYPERÆMIA IN THE TREATMENT OF CHOREA.

BIER, when introducing his treatment by passive hyperæmia, laid most stress on his own realms—namely, on surgical conditions—but he also suggested that the treatment might be applicable to cerebral conditions such as epilepsy, chorea, and certain forms of headache, and reported a few observations made in this direction.[1] Since then there appear to have been few, if any, further attempts to utilise his treatment in the cerebral region. Dr. Esau[2] has, however, been using it in the treatment of chorea in his practice in the Krankenhaus Oschersleben-Bode, and reports excellent results. The treatment consists in applying a rubber band round the neck in such a manner as to produce slight congestion of the head, at first for a few hours several times a day, and later when the patient has become accustomed to it, for 22 hours at a stretch. The only unpleasant symptoms arise from the local pressure, and these can easily be overcome by padding the band and by the application of alcohol to the skin. While this treatment was in progress Dr. Esau gave no drugs, nor did he keep the patient

[1] Grenzgeb. d. Med. u. Chir., vii., parts 2 and 3.
[2] Münchner med. Wochenschrift, June 22nd, 1923.

isolated, with the exception that in very severe cases he placed the child in an adult rather than in the children's ward. He found that chronic cases responded more rapidly than acute in their first attack. Six cases were treated, one of whom was a girl aged 13, who had suffered from chorea for the last seven years, each attack commencing in December and lasting till the following April. During the attacks every form of medical treatment had been tried, including long spells of isolation in bed, but without result. The child lost weight each time, and only slowly recovered during the summer months. On Jan. 29th, 1923, she was admitted to hospital for an acute attack of appendicitis. She was also suffering from chorea, which had been present since the beginning of December. Operation was successfully performed for the appendicitis, but had no influence on the chorea, which was very severe, and interfered with speech and with feeding. Three days after admission passive hyperæmia was commenced. On Feb. 10th the child lay quietly unless she was disturbed, when active movements of all the limbs took place. By Feb. 26th all choreic movements had disappeared and she was discharged. She was seen again on April 24th, when the general condition was excellent, the parents stating that she was better than she had ever been before. All inclination to whine and cry, which had always been present previously, had entirely disappeared. This case was cured in four weeks, when in former attacks it had taken four to five months. Another child had had two recurrent attacks, and when admitted had been ill for seven weeks, the movements throwing her out of bed, and making walking and speaking impossible. After 12 days' treatment she was able to stand and walk slowly, and in 26 days she was discharged cured. When seen again three months later she was in excellent health, and there had been no recurrence. The other four cases were equally severe and responded as quickly.

Dr. Esau also carried out a series of observations as to the effect of passive hyperæmia of the head on the general blood pressure. He found that the tendency was for the pressure to rise at the beginning of the congestion, but shortly afterwards to sink to the normal or even below it, but the results were far from constant, and it was difficult to distinguish between changes that were due to the congestion and those that occur normally without it. In some cases the blood pressure sank after removal of the constriction, but rose again shortly after—e.g., B.P. 117 mm. Hg during congestion, 109–105 after discontinuance, and 110–112 a few minutes later, but again these results were not constant, even with the same individual, and further observations on a large scale are necessary to confirm them. The pulse-rate was not affected by the congestion, demonstrating that the intracranial pressure never rose anywhere near that occurring in cerebral hæmorrhage or in meningitis.

PRIMARY CARCINOMA OF THE URETER.

IN a report of a case of primary carcinoma of the ureter, with a review of the literature, Dr. Louise H. Meeker and Dr. Joseph F. McCarthy,[1] of the department of pathology and bacteriology and the department of urology of the New York Post-Graduate School and Hospital, illustrate the rarity of this condition, which was first described in 1879, by stating that of the 33 recorded cases in only five was a correct diagnosis made before operation or death; 19 of the cases were in males and 14 in females. The youngest was aged 15 and the oldest 89. Death occurred in 14 instances before operation, some of which were inoperable, and after operation in 11; eight recovered after operation, and two of these reported that they were in good health a year after the operation. As regards the symptoms, the pain is of a relatively atypical nature. In only a small minority was it of the radiating type so frequently encountered in ureteral calculus. It was frequently referred to the lower abdomen, back, sacral and iliac regions, occasionally passing down the leg of the side affected, and was continuous instead of being intermittent as in calculus. On examination of the abdomen a tumour was found in 14 cases and on cystoscopic examination in six cases. In only four cases was pus found in the urine, the absence of pus in the other cases being probably due to the obstructive nature of the ureteral lesion, as hydronephrosis or pyonephrosis is frequently present. In seven instances the discovery of epithelial cells in the urine aided the diagnosis, but the writers point out that it is necessary to make frequent examinations of the urine for atypical cells, especially after attempts at ureteral catheterisation. The occurrence of hæmorrhage on ureteral catheterisation when calculus cannot be demonstrated is also of considerable significance. Chevassu and Mock, who claim to have made the first preoperative diagnosis of primary carcinoma of the ureter, were able to produce bleeding at will, as were also Chiari and Suter. When the ureteral catheter passes the obstruction functional tests frequently reveal renal impairment. A ureteropyelogram is of the greatest value when the obstruction is passed, but if the growth prevents the passage of a ureteral catheter the return of the fluid renders the method useless. The following operations have been performed for the condition: transvesical cauterisation, nephrotomy, resection of ureter and reimplantation twice, with recovery in both cases, nephrectomy with or without ureterectomy, ureterectomy and later nephrectomy, and primary nephro-ureterectomy. The case recorded by the writers was in a man aged 49, who complained of pain in the right hip radiating to the right inguinal and sacro-pelvic regions without any urinary symptoms. Physical examination three weeks before death showed pronounced abdominal tenderness and a cord-like mass in the right hypogastrium. There were marked emaciation and cachexia. The diagnosis was inoperable malignant disease of the colon or ureter. Death took place after six months' illness, and the autopsy revealed a tumour of the right ureter extending from the bladder to the renal pelvis and metastases in the liver, pericardium, lungs, spleen, pancreas, right kidney, lymph glands, and skin. There was right hydronephrosis. Microscopical examination indicated that the tumour had developed from the epithelium lining the ureter.

[1] Journal of the American Medical Association, July 14th, 1923.

VENEREAL DISEASES IN NEW SOUTH WALES.

THE first report of the Commissioner under the Venereal Diseases Act, 1918, is published as a section of the Report of the Director-General of Public Health to the Minister of Public Health of New South Wales. The Commissioner is Dr. Robert T. Paton, who retired from the position of Director-General on April 30th, 1921, on attaining the statutory age-limit. The period covered by the report is from Dec. 1st, 1920, when the Act came into operation, to Dec. 31st, 1921. The Act aims at ensuring that all cases of venereal disease will have immediate and continuous treatment and requires notification of all cases. A sufferer must place himself under treatment within three days of becoming aware that he is suffering. The Commissioner reports that the provisions have been applied with very satisfactory results, as the following figures show:—

Patients reported for failure to continue treatment ..	2472
Letters returned unclaimed	1286
Number of patients who resumed treatment ..	906
Cases not yet finalised	280

Certain difficulties in working the Act have arisen. Patients changing from one medical practitioner to another have failed to notify the first medical attendant. Patients have given another person's name and address and this other person has naturally resented the receipt of the warning notice. Nevertheless the fact that through the first year's working of the Act 906 persons have returned to treatment is a great gain. The Government provides free treatment at subsidised hospitals and, of 9405 cases

notified in 1921, 4477 were notified by metropolitan hospitals. The clinic accommodation has been increased and still further increase is necessary at Sydney and Newcastle. Some of the country hospitals try to send their cases to the metropolis, but Dr. Paton is strongly of opinion that every country hospital should make provision for the treatment of venereal cases. Special drugs and instruments are supplied free to country hospitals and all necessary biological examinations are carried out free at the Government laboratory. The provisions of the Act have stopped the advertisements of quacks and of so-called remedies. Posters and pamphlets are distributed, and Dr. Paton favours "the launching of a broad educative propaganda." He is also in cordial agreement with the resolutions passed by a conference of Commonwealth and States medical officers in Melbourne on Feb. 3rd, 1922, in favour of the establishment of prophylactic depôts as widely in the community as possible and of immediate self-disinfection as a useful auxiliary to the work of such depôts. Dr. Paton recommends a beginning by the establishment of two ablution depôts in Sydney, where information as to self-disinfection should be made available to any person desiring such information. The result of the second year's working of this Act in New South Wales will be awaited with interest.

THE LATE DR. E. K. MUSPRATT.

THE death, in his Grecian house at Liverpool, of Edmund Knowles Muspratt, in his ninetieth year, removes one of the pioneers of applied chemistry. His father, who actually founded the Lancashire alkali industry, sent his youngest son, Edmund, to study at Giessen, where he was attracted by the fame of Liebig, under whose influence he came. The story is told that he witnessed in Liebig's own household at Munich the first application of meat extract to sustain flagging energy in severe illness. Returning to Liverpool, Muspratt threw his immense energy into the heavy chemical industry, and took a large share in bringing it to the prosperous position which it now occupies. He managed for his father the chemical works at Liverpool and at Widnes, which later became incorporated as the United Alkali Works. Muspratt's knowledge of metallurgy was acquired in the cellar at Quay-street, Manchester, which did duty as a laboratory in Owens College, and after his success he donated £17,000 to the University of Liverpool to found the first completely equipped laboratory for the study of physical and electro-chemistry in the British Empire. It was owing principally to his efforts that the scheme took shape to bring to Liverpool water from Lake Vyrnwy, and Muspratt took a large share in the foundation of University College, now the University of Liverpool, which elected him as the first President of Council and as Pro-Chancellor from 1903 to 1909. His high acumen in adapting chemical knowledge to industrial processes was accompanied by unusual appreciation of literature and art, and he was besides a keen and observant traveller in Europe and America. Liverpool has lost in Dr. Muspratt one of her greatest citizens.

SOME CARRIER PROBLEMS.

THE county medical officer of health for Aberdeenshire, in presenting his annual report for 1922, emphasises the danger and expense of diphtheria epidemics, and the most successful method of stamping out the disease. Two epidemics occurred within recent years, one in 1913–14, and the other in 1920–21; expenses in the district hospitals alone in the latter epidemic amounted to £22,000. The number of cases of diphtheria last year was 125, compared with 321 in 1921 and 374 in 1920. Dr. J. P. Watt lays great stress on treatment by the immunisation method with toxin-antitoxin and the Schick test. It was of the utmost importance to stamp out infection in diphtheria carriers, for there was one carrier for every 100 adults and four or five for every 100 children. Much valuable work had been done recently by the Health and Education Departments in New York. Free inoculation with toxin-antitoxin had been given in all the New York schools with most successful results. The report also deals with the treatment of chronic typhoid carriers with detoxicated vaccines. It is well established that epidemics of typhoid fever may originate from a carrier, the typhoid bacilli surviving in the walls of the gall-bladder and kidneys. Such an infection has been found extremely difficult to eradicate. Cholecystectomy is not uniformly successful in bringing about a cure. In view of the successful treatment of chronic nasal diphtheria carriers at Summerfield Hospital with detoxicated diphtheria vaccine, Dr. Watt determined to treat chronic typhoid carriers with a course of detoxicated typhoid vaccine. To one carrier of 20 years' duration injections were given subcutaneously every fifth day; at the end of three months typhoid bacilli were still present; at the end of six months an atypical bacillus, which did not agglutinate. After a second course of treatment by injection and also orally, this bacillus disappeared and all samples were negative. Dr. Watt hesitates to draw conclusions as yet from such treatment, as typhoid carriers may be "negative" for considerable periods. Many samples must be examined over an extended time before a definite cure can be claimed. But his observation is suggestive.

PRURITUS OF THE ANAL REGION.

A NICE distinction in nomenclature is suggested by Dr. J. F. Montague, who classifies[1] under the two headings of Direct and Indirect all types of pruritus of the anal region; he reserves the term Pruritus Ani for direct cases—i.e., those in which there is a local irritant such as a fissure—and styles the indirect cases anal pruritus. He explains all cases of indirect pruritus—i.e., those which occur in the absence of any local lesion or irritant—as due to the transference of an irritable stimulus from visceral afferent nerves to somatic nerves with a consequent misrepresentation or error in localisation of the resultant sensation, and gives the following anatomical explanation. The pruritic zone is supplied by sensory nerves from the first four sacral nerves, which are in intimate neural connexion with the pelvic and other abdominal viscera, through the aortic and hypogastric plexuses and when a viscus is the seat of chronic inflammation, congestion, and hypertrophy the mechanical tension sets up efferent stimuli which the spinal cord misunderstands. He points out that indirect pruritus is not relieved by local anæsthesia, as is the case with the direct type, but, unfortunately, the indirect soon has the direct grafted on it when the patient has developed the scratching habit. The pathology of pruritus is in the main so obscure that we welcome any attempt at its elucidation.

[1] The Etiology and Pathogenesis of Anal Pruritus and Pruritus Ani, Transactions of the American Proctologic Society, 1922.

THE Medical Branch of the Board of Education has been transferred to 54, Victoria-street, London, S.W. 1. The telegraphic address is "Meducation Sowest, London."

MEDICAL REPRESENTATION IN THE NEW DAIL.—The elections in Ireland have resulted in the return of a larger number of medical men than sat in any previous Dail. Of those who were members of the last Dail, two—Dr. P. McCartan, who did not seek re-election, and Dr. V. White, who was unsuccessful—are absent. Among the independent members Sir James Craig, F.R.C.P.I., and Dr. Myles Keogh, retain their seats, as does also Dr. R. Hayes, of the Government Party. The Republican, or Sinn Fein, party contains no less than five medical practitioners—Drs. J. Crowley, P. McCarville, O'Byrne, J. Ryan, and Kathleen Lynn. The last-named is the first woman doctor elected to any Parliament in the British Islands. It is not yet known whether the members of the Sinn Fein party will take their seats, and therefore one cannot foretell what effect on health policy the presence of so many doctors in that party may have.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

XXXV.

THE TREATMENT OF ENURESIS.

THERE is none of the minor ailments of children which has so marked an effect on the moral and mental well-being of a child, and in later years on his material prospects, as the habit of nocturnal incontinence of urine. It is a troublesome complaint both to the parents, the patient, and to the doctor who is called upon to treat it. Although from time to time the virtues of some chosen therapy are proclaimed, consideration of the physiological aspect of micturition makes it obvious that there can be no one method or drug which can be relied upon to improve the trouble. In the infant the evacuation of the bladder is purely a reflex act. Almost any conceivable stimulus is sufficient to excite the centres in the spinal cord which control the act of micturition, with the result that the bladder contracts and evacuates its contents completely. During the first year of life this is the normal condition, and it is frequently prolonged into the second year. A careful nurse can, however, often train her charge in such a way that by the end of the fifteenth month the spontaneous evacuation of the bladder is a comparatively rare event; and except for accidents or illness incontinence is uncommon after the end of the second year. The training which will accomplish this result is, of course, largely attention to the proper evacuation of the bladder at regular intervals. If after the age of 2 years enuresis or precipitate micturition during the day is present it must be considered as no longer a physiological but a pathological phenomenon.

Enuresis in young children is usually dependent on a reflex contraction of the bladder, but exceptionally the symptoms suggest an overflow incontinence; the child is said to "drip like a tap." It is probably this type which has led some observers to talk about the failure or absence of the sphincter, and to suggest various kinds of local treatment based on this supposition. In fact, in those cases of this type which I have seen I do not think that there has been any reason to suppose such a failure; they regained control with ordinary treatment quite as rapidly as the more usual type. Another condition which is much more difficult to treat successfully occurs in the children at or even after puberty, in whom incontinence has existed for some years. In them the bladder appears to have reached a condition of extreme local irritability, which makes it impossible for the urine to be retained for more than a few minutes at a time. Such unfortunates have almost reached the same state as the child who is afflicted with extroversion of the bladder. My experience, however, is that even with these patients something can be done. These cases of "dripping like a tap" and of "vesical spasm" are not the common type. The majority belong to the "reflex contraction" group. These patients nearly always, besides the nocturnal enuresis, have precipitate micturition during the day, and it is that symptom which must be first tackled.

There are two groups into which the children who are brought with enuresis can be divided. The group (A) which is congenital—that is, in which the normal control which should come by the end of the second year has never been attained; and the group (B) which has an acquired condition—that is, in which the normal control has been gained and subsequently lost.

The Congenital Group.

In the first group will be placed the children who suffer from congenital defects, whether physical—for example, extroversion—or mental. It is obvious that very little can be done for them. It will also include the children who suffer from minor epilepsy; who, perhaps, have never had a fit, but whose history, when carefully and fully considered, contains suspicious details. One such suspicious fact is the intermittence of the enuresis. The child will go for some considerable time without enuresis, and then have a series of accidents within a week or two, after which he will again be untroubled. If with such symptoms there is a story of inattention, or giddiness, or attacks of dazedness the probability of epilepsy being the cause is enhanced, and in such instances the use of bromides in small doses is, as a rule, effective. When these cases are exhausted there are still left a considerable number in whom there is no obvious reason for the continuance of the incontinence; they are cases of so-called "essential enuresis."

Acquired Enuresis.

The same will be found true of the second group of acquired enuresis. In some few of such cases it is possible to discover an obvious exciting cause. For example, in some of the older school-girls there is a chronic intermittent *B. coli* pyelitis and cystitis, the treatment of which will stop the enuresis. In others there is some traumatic cause—for example, the presence of a stone in the urinary tract (incontinence may be the only symptom of its presence); in rare instances there may be tuberculosis of the tract, or a reflex excitability may have been established by the existence of a balanitis or a vulvitis. But in the majority there is no obvious cause; they are cases of "essential enuresis."

Essential Enuresis.

Essential enuresis is the persistence of, or return to, the reflex condition of the infant; and though the removal of some of the more obvious exciting stimuli may in some lucky cases effect a dramatic cure such a result is not very common. Often the removal of adenoids has been held out as certain to stop the urinary trouble, which all the same persists; the presence of worms in the large intestine has been held responsible, but their effective treatment has not removed the enuresis. Dietary treatment has been given without good effect. All these things are part of any effective treatment, but nothing in my judgment can replace the re-education of the child just as if he or she were a baby in the second year. The education must begin by teaching the child to control the bladder during the day. If the water can be retained for a period of two hours only, then every two hours the bladder must be properly emptied. After a few days, when the excitability is lessened, the period can be lengthened to three hours, and it must be forbidden to the child to perform the act at any other than the stated time. This is a prescription which sounds more difficult to carry out than it is found to be in practice. The interval is then lengthened to four and five hours, and then lastly to three times in the 24 hours. By the time that the child has learnt to control micturition during the day to this extent the nocturnal enuresis will, as a general rule, also have disappeared, but its disappearance can be helped by some simultaneous attention to this part of the trouble. It will be found on careful inquiry that most of the children who wet the bed do so in the first two hours of sleep. If they are wakened at the end of an hour and made to empty their bladder it often happens that the rest of the night will be dry. It is not always so, and it may be necessary for a short time to waken them every three hours, but with the increasing control during the day the nocturnal symptoms become less severe.

This method of training in a nursing home or a hospital is generally successful in a short time, a month or even less, but too often there is a relapse because the punctuality of an institution is not observed at home. However rapid and complete the apparent success, the method of training should be persisted in for at least six months.

Training is, I think, the one essential without which all else is likely to be useless, but there are various

adjuvants. There should be no attempt to restrict the intake of fluids, a step which leads to the secretion of a highly concentrated urine, likely to be exciting to the bladder—in fact, I think it is advantageous to promote diuresis by the administration of potassium citrate. There are also some other drugs which I have occasionally believed to be beneficial. The first of these is strychnine given as liq. strychninæ in doses which are large for the age of the child; I should, for example, give ℥ v.–vii. three times a day to a child of 6 years, for a week at a time. The second is thyroid, which I like to give to those children who are lethargic and inactive; the bright, energetic, excitable child is better without it. I use doses of gr. 1–3 twice a day. The third drug is belladonna, a time-honoured remedy, usually given in too small doses; to be efficacious it requires to be given in such doses as will produce a physiological effect, either in complaints of dryness of the mouth and throat or in loss of accommodation. Children vary much in their tolerance of this drug, and the proper dose must be ascertained for each case. It is safe to begin with a dose of ℥ x. of tinct. bellad. three times a day, increasing this rapidly till the physiological effect is obtained. Another drug which I have occasionally found useful is potass. chlorate. Why it should have any effect I cannot tell, but I have satisfied myself that it is of benefit in some cases. I have used many other drugs and failed to find any of value, though iron and arsenic are, of course, useful where there is a need of tonics. As regards diet, I think there is profit in a prohibition of sweets, and also in reducing, if need be, either the starchy or the nitrogenous parts of the meals—that is, in stopping over-feeding.

With such methods I think the prospect of success is good in about 75 per cent. of the cases of essential enuresis within a period of six months. Of the remaining 25 per cent. the majority can be cured by persistence in treatment over longer periods up to two years, but there is a small percentage in which the condition continues, apparently without appreciable improvement, up to puberty. In a very few cases, chiefly in girls, it may persist into adult life. Electrical treatment has proved disappointing in my hands, whatever the method adopted, and the same is true, so far as my own small experience goes, of any form of psychotherapy.

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Special Articles.

BACTERIOLOGY OF CONDENSED MILKS.

A REPORT[1] TO THE FOOD INVESTIGATION BOARD.

THIS long report, of 103 octavo pages, deals with both varieties of condensed milk, but the two reports are quite distinct and the scientific problems in the two cases are very different. Both are essentially bacteriological studies, and methods of manufacture, chemical composition, &c., are only briefly discussed in so far as they are required to make the bacteriological findings intelligible.

SWEETENED CONDENSED MILK.

All the samples examined were of the full cream variety. A short study is given of the methods of inspection adopted at the ports of entry on lines similar to those given in previous reports on canned meat and marine products. With blown samples no difficulties were met with, but the judgment of the inspectors as regards springy and otherwise defective tins was only correct in about half the cases. These tins are not, however, of great importance, since the majority of rejects are due to gaseous decomposition.

The bacteriological studies are based upon a detailed examination of 95 samples of which 33 were "blown" rejected tins, 13 rejected for other physical conditions, 15 sound shop tins, and 34 sound factory tins, the latter being tins obtained direct from condensed milk factories passed as sound, the exact date of manufacture being known. In addition, 32 samples of sugars, fresh milk used for condensing, air samples, or deposits from pipes in the factories were examined. A large number of experimental tin inoculation experiments were also carried out.

Organisms Isolated and Their Significance.

Sweetened condensed milk is never sterile and the distribution of yeasts, micrococci, anaerobes, gas-producing aerobic bacilli, sporing aerobic bacilli, and thermophilic bacteria are separately considered. The report shows that the relative importance of these groups are very different. Apart from the possible presence of tubercle bacilli and perhaps some types of streptococci, none are of pathogenic significance. Micrococci were present in every sample of sweetened condensed milk as streptococci, staphylococci, and diplococci. They are in part survivals from the original milk in part gaining access during manipulation after condensation. Anaerobes, on the other hand, were only found in 2 out of 76 tins. While both were from infected tins direct experiment showed they were not a cause of unsoundness. The physical changes consequent upon condensation makes the milk an unsuitable medium for their growth. Gas-forming aerobic bacilli were isolated from 7 tins, or 9·3 per cent., of the samples examined. All were *B. coli* strains almost identical, all fermenting both lactose and saccharose, and so potential causes of the blowing of tins, particularly as they grow well anaerobically. Numerous experiments, including direct inoculation of tins, showed that while their growth is not inhibited by 40 or even 50 per cent. of saccharose they will not grow and ultimately die out in condensed milk. Either from its viscid nature or from some other cause it is a medium unfavourable to their growth and viability. These results were in accordance with the distribution of the organisms in the samples and suggest that this type is not a cause of unsoundness in this food product.

Considerable interest attaches to the group of sporing aerobic bacilli, since they were isolated from 92 per cent. of the tins, while the authors consider they are probably present in every sample. In view of their ability to decompose milk and proteins generally, they are potential causes of decomposition. On the other hand, their wide distribution in tins, sound and unsound alike, suggests that they do not, in fact, do so, and this was confirmed by a number of direct experiments. These showed that their harmlessness was not due to the anaerobic conditions to any material extent and only very partially to the high percentage of saccharose, but must be ascribed to the colloidal changes in the milk produced as a result of condensation. Under the three conditions combined they are incapable of producing any decomposition or proteolytic changes in the milk. Thermophilic bacteria, all of sporing type, were isolated from 76 per cent. of the samples examined and were found to be of no significance as a cause of decomposition. They are probably survivals from the original milk.

Yeasts.

On account of their great importance special attention was given to this group of organisms, and over 22 pages are devoted to a detailed study of their presence, distribution, and significance in this type of condensed milk. Yeasts were present in 91 per cent. of the "blown" tins examined, and this condition is almost invariably due to the growth and chemical activities of yeasts. The problem, however, is not

[1] Studies in Sweetened and Unsweetened (Evaporated) Condensed Milk. By William G. Savage, M.D., B.Sc., and R. F. Hunwicke, B.Sc., A.I.C. Department of Scientific and Industrial Research. Food Investigation Board. Special Report No. 13. H.M. Stationery Office. 4s.

the simple one of unsoundness being due to their presence alone since yeasts, including many fermenting yeasts, were isolated from many sound factory samples and were shown not to originate decomposition changes. The yeasts isolated were grouped under seven different types, the chief points of importance being their fermenting properties as regards saccharose and lactose and their ability to grow in 40 and 50 per cent. saccharose solutions. That fermenting yeasts under suitable conditions can cause tins to become blown was amply demonstrated by numerous direct experiments in which sound tins were inoculated. A long series of experiments, using special forms of apparatus, enabled a coherent and practical explanation to be given of the prevalence of even fermenting types of yeasts in sound samples of condensed milk. Living yeasts may be widely distributed in condensed milk even when manufactured under modern and scientific conditions. Yeasts do not readily multiply in such milk. This is not due to the high percentage of saccharose, is in part due to the fact that condensed milk is a medium not very suitable for their growth, but is chiefly because of the restricted supply of oxygen. "In tins of condensed milk the supply of oxygen available is very limited and is soon exhausted. If the yeasts are present in sufficient numbers, or if they can multiply sufficiently with the little oxygen available, then they will be able to produce sufficient enzyme to break down the saccharose and produce gas. They are then comparatively independent of any oxygen supply and need not go on increasing materially in numbers, but their enzymes can steadily produce gas." If only a few fermenting yeasts gain access they are unlikely to produce gas and cause the tin to become blown, because they will not increase sufficiently before anaerobic conditions become established in the tin, thus causing their multiplication to cease. Under such conditions they gradually die out. These facts are of great practical importance in connexion with the prevention of unsoundness and suggest many points of importance in manufacture.

A study of their source showed their invariable presence in the air of the condensing factories, and this and their survival in the milk used, due to insufficient preliminary heating, must be regarded as their main sources. An important source keeping up their supply is from deposits in the pipes leading from the vacuum pans, as after the milk has been pasteurised it is never again subjected to temperatures high enough to secure the destruction of yeasts.

Changes on Keeping.

A long series of observations were made upon changes in bacterial content, acidity, colour, and consistency under different conditions. The average number of organisms per gramme was usually low in fresh samples and fairly uniform considering the consistency of the material. When tins were kept *unopened* at 21° C. and 37° C. there was usually a diminution rather than an increase in the number of organisms, but when a small amount of sterile air was admitted the number of organisms showed a marked increase for the first two weeks or so, followed by a diminution, so that at the end of about three months the numbers were often less than at the start.

No facts of special interest were elicited as regards acidity and H-ion concentration changes with time. The darkening in colour was not associated with bacterial activity, and is probably due to caramelisation of some of the sugar. It took place much more rapidly at higher temperatures. The thickening and increased viscosity which takes place with time showed no relationship to changes of acidity or bacterial activity and were colloidal in character.

Practical Considerations.

There is no suggestion that the bacteria and yeasts which are present and which are the subject of detailed study are harmful to the consumer, and the report is mainly of interest as a detailed study of the causes of unsoundness and the prevention of wastage and food loss. Compared with new cow's milk condensed milk is a food of very low bacterial content. The report does, however, supply much scientific information into the causes of condensed milk decomposition and how to prevent such deterioration. The practical points indicated as of the greatest importance are the necessity to ensure the destruction of yeasts in milk before condensation, cooling the milk under conditions which avoid air contamination, the use for the condensed liquid of suitable right-angle pipes taken apart and sterilised every day, canning of the milk as soon as possible after condensing, and in particular the use of airtight containers.

UNSWEETENED CONDENSED MILK.

For this food it is pointed out that correct condensation offers many difficulties, and the margin between success and failure is probably a narrower one than for any other type of canned food. A brief account of methods of manufacture is given. The bacteriological studies are based upon the examination of 104 different samples—rejected, shop, and sound factory samples. This type of condensed milk showed a much higher proportion of sterile tins, the actual percentages being 85 for the shop and 76 for the factory tins. The organisms found were most commonly sporing aerobic bacilli, but also micrococci and one yeast. No physical alterations were noted in the contents.

Of the 60 rejected tins 47 showed definite abnormalities in the contents. It is of interest to note that the causes of the unsoundness were very different from those found with the sweetened variety. Yeasts were unimportant and only a cause of unsoundness in one sample. Sporing anaerobes accounted for 3, micrococci for 18, gas-producing aerobic bacilli of *B. coli* and *B. cloacæ* type for 6, and a special type described as "coccoidal bacillus" type for 5. The cause of decomposition was not ascertained in the remaining tins and 7 of them were sterile. The experiments carried out do not support the possibility that chemical changes are ever a cause of a blown condition. The suggestion that micrococci may not only cause decomposition changes in the contents but even the development of gas is a new conception, but is supported by a number of experiments in which it is shown that under special conditions the micrococci selected did produce gas from unsweetened condensed milk. The gas produced was carbon dioxide and the blown condition could not therefore be ascribed to hydrogen developed from the chemical action of the milk on the tin retainer.

The coccoidal bacilli constitute a new type which show marked pleomorphism. The authors mention that they have found it rather prevalent in unsound canned fruit as a cause of unsoundness.

Practical Considerations.

The conditions which may produce unsoundness are complex and not merely a question of the presence or absence of certain types of bacteria, since there are some types which at one time are inert while at others they make the food unsound. The changes in the condition of the milk as a result of its concentration are profound and not merely those caused by a deprivation of much of the water. The milk so altered is in general less suitable for bacterial multiplication. The manufacturer has many difficult problems to contend with, and very slight differences in the temperature of sterilisation and slight changes in acidity may yield a coagulated useless product. It is doubtful whether the temperatures of processing which can be adopted without risk of damaging the product are capable of always ensuring a sterile product. Probably in many cases a few spores are left undestroyed. The results of the authors show, however, that decomposition is nearly always due to non-sporing bacilli, and that what the manufacturer has to guard against are the survival of non-sporing bacilli (especially the more resistant types of micrococci) and the admission of air through minute leaks which may enable dormant forms to multiply and cause decomposition changes.

ARSENICAL POISONING.

THE WORK OF THE SWEDISH COMMISSION.

SOME years ago the Swedish medical profession and, to a certain extent, the lay public were much exercised over the part played by arsenic in wall-paper, clothing, and domestic articles, and the discussion of this subject led to the appointment by the Swedish Government of a Commission composed of chemists and doctors. Prof. K. Petrén, of Lund, presided over this Commission and was in special charge of the clinical side of the investigations. These were not merely concerned with sifting evidence already available; new and important researches were undertaken, and some of them have thrown valuable light on the problems of arsenical poisoning. In a recent communication published in French, Prof. Petrén[1] has given a summary of the most instructive findings of the Commission. Simultaneously a 240-page monograph has been published in German by his collaborator, Dr. L. Brahme,[2] whose researches deal with the presence of arsenic in the blood and cerebro-spinal fluid. Another investigator, Dr. Bang, who has recently died, carried out systematic examinations for arsenic in the urine of healthy persons. His work was published in 1919 in Swedish,[3] and a short summary is given of it in Prof. Petrén's paper.

House Poisoning with Arsenic in Sweden.

The term "house poisoning" covers poisoning by arsenic from such sources as wallpaper, clothing, articles of furniture, stuffed birds, and the like. Inquiries addressed by the Commission to Swedish practitioners as to the occurrence of cases of house poisoning elicited records of 91 cases, but when these came to be scrutinised very few were found to be proven. The same observation was made when the literature of the subject was sifted, and it was found necessary to fix certain standards and criteria by which the genuineness of cases of arsenical poisoning of this class could be judged. For arsenical house poisoning to be diagnosed it must, among other things, be proven that the symptoms began within one to three months of exposure, and ceased within three months of the cessation of such exposure to house poisoning. In this connexion it is not conclusive evidence of house poisoning that a patient loses his or her symptoms after leaving a room in which arsenic has been found, for there may have been other morbid influences at work in this particular room.

The Literature of House Poisoning.

Prof. Petrén's excursions into the literature of the subject revealed the curious fact that it has appeared and reappeared in different countries in batches; in Sweden the period 1850–81 yielded a large batch of publications. In Germany similar publications were practically confined to the period 1853–81, and in the Anglo-Saxon countries to the period 1853–92. Altogether about 125 publications were found to be worthy of special scrutiny, and even in this sifted material much evidence of doubtful value had to be discarded. Only 36 Anglo-Saxon, 8 German, and 17 Swedish publications contained reliable data, and it was noteworthy that comparatively recent observations were, on the whole, those on which least reliance could be put.

Differences in the Manifestations of Poisoning by Arsenic from Various Sources.

It is a very remarkable fact that the symptoms of poisoning vary greatly according as arsenic is taken by the mouth, is absorbed by workers in arsenic, or enters the system as the result of house poisoning. When arsenic is taken in large doses by the mouth, melanosis and polyneuritis are prominent sequels, whereas melanosis has never, and polyneuritis has rarely, been observed in cases of house poisoning. On the other hand, workers in arsenic, in contact with Schweinfürth's green, are liable to suffer principally from cutaneous lesions such as erythema, papular and pustular eruptions, and even gangrene. These manifestations are practically unknown in cases of poisoning with arsenic given by the mouth, and it is therefore probable that in industrial arsenical poisoning the arsenic acts directly on the skin, the face, neck, and hands being the parts most affected. No case of industrial arsenical poisoning has yet been recorded in which melanosis was seen. Arsenic given by the mouth provokes digestive disturbances such as diarrhœa and also conjunctivitis, whereas in house poisoning the principal symptoms are lassitude, headache, giddiness, and irritation of the eyes and pharynx. Diarrhœa is comparatively rare and only in a few cases has polyneuritis been observed. The manifestations of these three different forms of arsenical poisoning being so distinctive, it has been suggested that in house poisoning some volatile compound of arsenic is responsible for the symptoms. Working on this suggestion, a member of the Commission, Dr. M. Ramberg, professor of chemistry, carried out investigations with regard to the development of arsenical gases from the action of arsenic on certain moulds. He came to the conclusion that the composition of the gases thus generated is inconstant, and he was unable to confirm Biginelli's hypothesis that the arsenical gas generated under these conditions is diethylarsine. Prof. Ramberg's and Prof. Petrén's last conclusion in this matter is that in arsenical house poisoning several highly toxic substances are concerned, the composition of which is still unknown.

Arsenic in the Urine of Healthy Persons.

One of the most important of the researches carried out under the auspices of the Commission was concerned with the demonstration of arsenic in urine of healthy persons. Until Dr. Bang began his investigations in this matter, it was generally held in Sweden that the demonstration of a certain quantity of arsenic in the urine was equivalent to the demonstration of arsenical poisoning. Little or nothing was known of the conditions under which, in health, the arsenical content of the urine might vary. After devising a new and delicate test for arsenic in urine, Dr. Bang found that the arsenic in normal urine might vary from a trace to 1 mg. per day. The great and rapid changes in the arsenical content of normal urine led Dr. Bang to investigate the arsenical content of various foods, and he found that while some vegetables contain little arsenic, others contain much. The amount of arsenic found in fish varied considerably, but in most cases it was amazingly great. The differences in the arsenical content of fish seemed to depend largely on the water in which they lived; some sea-water fish contained as much as 4 mg. per kilo. This discovery largely explains the inconstancy of the arsenic content of normal urine. At Prof. Petrén's hospital Dr. Bang examined for arsenic the urine of patients fed for a certain time on such articles of food as milk, cream, oatmeal, and eggs, which are poor in arsenic. While they were on this dietary their urine contained only traces of arsenic. But when, on several consecutive days, they were given a liberal dietary of fish, the arsenic content of their urine rose rapidly, and it fell again when the fish dietary was withheld.

Other Findings of the Commission.

A matter to which Prof. Petrén returns frequently in his paper is the great difference in the toxicity of various compounds of arsenic, and the differences in the reaction of the body to the same compound. In the case of salvarsan, for example, the reaction of the body would seem to depend to a certain extent on the nature of the pre-existing infection, and the reaction of syphilitics to salvarsan is probably peculiar to this class of case. Prof. Petrén gave neosalvarsan to patients suffering from influenza during the epidemic of 1918 and found that the first and only toxic effect was vomiting—an observation suggesting that the response of the influenza-infected body to salvarsan

[1] Acta Med. Scand., 1923, vol. lviii., Fasc. II.–III.
[2] Acta Med. Scand., Supplementum V., 1923.
[3] Urinens Fysiologiska Arsenikhalt. Svenska Arsenik-kommissionens Betänkande, 1919, Supplement 11.

differs from that of the syphilitic patient. One of Dr. Brahme's most interesting observations referred to the behaviour of arsenic in relation to the cerebro-spinal fluid. He confirmed the observations of Tinel and Leroid, who found that while arsenic cannot reach the cerebro-spinal fluid through healthy membranes, it may do so when these membranes show morbid changes. Several other lines of research were followed by the Swedish Commission, the work of which has added not a little to our knowledge of the toxicology of arsenic and its compounds.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE following table gives some of the principal health statistics of seven large towns for the year 1922:—

Name of town.	Estimated population (mid-year).	Birth-rate.	Death-rates per 1000 of population.				Death-rates per 1000 births.		
			All causes.	Tuberculosis.	Cancer.	Respiratory with Influenza.	Infant mortality		Maternal mort. in childbirth.
							Legit.	Illegit.	
Edinburgh ..	423,155	20·7	15·2	1·3	1·5	2·6	88	128	3·8
Blackburn	129,376	16·8	14·2	0·9	1·3	3·8	97	140	7·0
Hull	294,000	24·2	14·4	1·4	1·2	3·7	101	210	3·9
Leicester	238,800	19·4	12·7	1·5	1·2	2·6	85	141	3·0
Portsmouth ..	236,630	22·1	12·1	1·1	1·2	2·3	61	100	2·6
Preston	120,900	20·5	13·7	1·2	1·0	3·4	96	129	4·8
Stockport	125,800	17·4	13·4	1·1	1·3	3·7	76	96	7·3

All these towns suffered from the influenza epidemic during the first quarter, but it is perhaps justifiable to attribute the lessened fatality of respiratory diseases in Edinburgh, Leicester, and Portsmouth to the cleaner air when comparison is made with Blackburn, Preston, and Stockport. The three last-named towns also show a high maternal mortality in childbirth. The effect of the boot and shoe trade is no doubt seen in the tuberculosis mortality rate of Leicester. The table brings out the fact that cancer now frequently causes more deaths than all forms of tuberculosis and the marked difference that still exists between the mortality of illegitimate and legitimate infants, in spite of maternity and child welfare work.

Edinburgh.

Dr. William Robertson presents the report for a year during most of which the late Dr. Maxwell Williamson was medical officer of health, and in doing so suggests that future policy must be directed at prevention in its fullest and most literal sense. Edinburgh, he says, has splendidly equipped institutions for coping with epidemic diseases and tuberculosis, and it should now be our aim to reduce the demands on these institutions. Dr. Robertson looks forward to the ensuing years when big improvements in Edinburgh housing conditions may be confidently expected. "No matter in which direction he may turn, the sanitary reformer will always find the spectre of the housing problem facing him."

Dr. T. Y. Finlay's report on child welfare mentions that the Toddlers' Play centres continue to fulfil a useful and necessary piece of work. Of 58 notified cases of ophthalmia neonatorum, one case had both eyes damaged and in two cases it was recorded that previous children in the family had been affected by the disease. Dr. John Guy, the tuberculosis officer, shows that the decline in pulmonary tuberculosis was only retarded, but never ceased, during the war, and that in 1922 the number of deaths was the lowest ever recorded. It is admitted that Edinburgh and Glasgow suffered less from fat restrictions during the war than English towns, and one wonders to what extent this factor accounted for the very varying results obtained as between one town and another. Dr. Guy emphasises the importance of milk as a cause of non-pulmonary tuberculosis, and states that 30 per cent. of gland cases, 18 per cent. of meningeal cases, 50 per cent. of abdominal, 58 per cent. of bone, and 50 per cent. of lupus cases are due to this cause. The importance of segregation of infectious cases is insisted upon and an estimate is given that, at present, infectious cases are segregated during one-third of the period of infectivity

Dr. Claude B. Ker mentions that the staff of the City Hospital has been subjected to the Schick test and that those who gave positive reactions have been inoculated with toxin-antitoxin mixtures. Mr. David Lees, the V.D. medical officer, states that there is a marked improvement in the attendances and the number of cases completing treatment. There is, however, urgent need of a treatment centre and hostel accommodation for merchant seamen near the docks, in order to secure continuity of treatment.

Blackburn.

Dr. W. Allen Daley's report shows that the Blackburn Corporation is actively engaged in improving sanitary conditions. Nearly 9000 pail closets have been converted into water closets or abolished since 1920. Blackburn is supplied with water from upland gathering grounds. An investigation of the plumbo-solvent properties of the water was undertaken during the year. The public analyst, Mr. W. H. Roberts, reports that the water is soft, of good quality, and practically neutral, and that its action on lead is so slight as to be negligible. Dr. Daley reports a shortage of houses. The Corporation completed 89 houses during the year. Applicants show a preference for non-parlour houses. There is some serious overcrowding and over 100 houses are past repair, but cannot be closed. There is considerable undesirable subletting, and Dr. Daley thinks there is a demand for small cottage flats. A campaign is in progress against the smoke nuisance and another in favour of clean milk. Energetic steps are being taken to improve the ventilation and hygiene of the cinemas. Attention is being given to the better protection of food from contamination. Particulars are given of the present condition of consumptive patients discharged from the Blackburn Corporation Hospital and Meathop Sanatorium during past years. In the case of the former, 82 of 709 patients discharged since 1913 are at full work, 350 are dead, and 96 cannot be traced. In the case of Meathop, 63 of 445 patients discharged since 1908 are at full work, 177 are dead, and 79 cannot be traced. The window-cleaning business managed by the Charity Organisation Society for ex-sanatorium patients is in a prosperous condition. Dr. Daley comments on the high mortality associated with childbirth and looks to efficient and popular ante-natal clinics, combined with adequate maternity home accommodation, to bring about an improvement. The maternity home accommodation will be increased during 1923.

Hull.

Dr. J. Wright Mason reports that the maternity and child welfare work has been reorganised under a whole-time medical officer, Dr. Katherine Gamgee, who began work in June, 1922. Attention is called to the high death-rate among babies suffering from ophthalmia neonatorum and the laxness of the midwives in notifying this condition. Comment is made on the high infant mortality rate and the fact that Hull compares badly with other towns during 1922 with respect to diarrhœa. 334 municipal houses were completed during the year. On account of the housing shortage, many older houses, intended for one family only, are now being occupied by two or more families.

Leicester.

Dr. C. Killick Millard reports three important events during 1922—viz., the retirement of Alderman Windley after 46 years as chairman of the Health Committee, the retirement of Chief Sanitary Inspector Braley after 50 years' service, and the decision to acquire new premises for the Health Department outside the Town Hall. Alderman Windley's service has been commemorated by the establishment of four secondary school scholarships named after him. Dr. Millard thinks the housing shortage may have increased the marriage rate. Formerly young people "saved up" for furniture. Now they need not wait "to save up."

The Leicester leaflet giving elementary facts with regard to cancer has aroused many expressions of approval. Dr. Millard would like to see a campaign started to bring home to the public the disastrous effects of dental caries. His remarks deal chiefly with early treatment. The leaflet on prevention published in our issue of August 4th (p. 265) might well form a basis for such a campaign. Leicester, unlike Edinburgh, showed a very definite increase of deaths from pulmonary tuberculosis during the war, but the average number of deaths for the four post-war years is lower than that for the four pre-war years.

An open-air school is needed in Leicester. Very good work has been done by the seaside summer camp at Mablethorpe, where 593 children spent a fortnight last year. Dr. Bessie Symington, M.O. of the Women's V.D. clinic, reports that great efforts have been made to persuade mothers to come up for treatment during pregnancy. None of the 26 syphilitic mothers treated gave birth to a diseased child. In spite of the fact that both maternity homes have ante-natal clinics, it was not possible to persuade any of the mothers attending these ante-natal clinics to go for treatment to the V.D. clinic. This confirms the view of those who think that in order to secure adequate treatment of the expectant mother suffering from venereal disease, it is necessary to provide such treatment at the ante-natal clinic. The health committee have decided to obtain Grade A (tuberculin tested) milk for the Isolation Hospital Sanatorium, maternity home, and day nursery. Although visitors from northern towns regard Leicester as a clean-air town, it is pointed out that there is considerable room for improvement as regards smoke abatement. "Shortage of housing accommodation," says Dr. Millard, "remains Leicester's most crying need."

Portsmouth.

Dr. A. Mearns Fraser says the one subject above all others to which he must specially refer is the urgent necessity for the provision of housing accommodation. He believes that the problem can be solved by the rapid development of the splendid site on Portsdown Hill (524 acres). The Corporation have completed 543 houses, but the position is hardly less acute than it was two years ago. There are 2000 urgent applications for houses, many unfit houses cannot be closed, and one unhealthy area, including some deplorable houses, cannot be dealt with. The Portsdown Hill site Dr. Fraser regards as ideal, and he would have every effort made to induce private builders to develop it. In six of the 17 notified cases of enteric, improperly cooked local shell-fish, cockles, winkles, and butter-fish, were suspected as the cause. The war rise in the death-rate from pulmonary tuberculosis is well brought out by a chart. Since the war the rate is lower but tends to be stationary, and the greatest hope for the continuance of the decline lies, Dr. Fraser thinks, in an improvement in housing and the development of the Portsdown Hill estate. During the year 12,000 gallons of electrolysed sea-water disinfectant were manufactured by the municipality. The public analyst, Mr. Reginald P. Page, lays stress on the fact that the addition of chemical preservatives to food is steadily on the increase, and instances samples of "home-made" mincemeat, containing no spirit preservative but salicylic acid.

Preston.

Dr. F. A. Sharpe says the shortage of houses is not causing numerical overcrowding because the population is practically stationary, but that it is causing the loss of comfort, domestic necessities, and decencies, owing to the housing of more than one family in a house. One of the great needs of Preston is a home nursing service. In December, 1922, an unsuccessful attempt was made in the committee to reduce the permissible limit for black smoke emission from factory chimneys. There are about 135 factory chimneys in the borough and they are apparently permitted to emit five minutes of black smoke every half hour. Fortunately they do not all avail themselves of this privilege. Several of the seven proved cases of enteric fever were attributed to polluted mussels. There was a slight increase both in notifications of and deaths from tuberculosis during the year.

Dr. Mary Lowry, the maternity and child welfare medical officer, discusses the causes of high maternal mortality from childbirth. Arrangements have now been made to admit cases of puerperal fever to the isolation hospital. Of the nine deaths from other accidents, &c., of pregnancy, Dr. Lowry, after investigation, thinks that at least three might have been prevented had the woman been under skilled ante-natal supervision. There is as yet no definite coöperation between the ante-natal and V.D. clinics. The school medical service has not been reduced in scope, but the existing organisation is insufficient to deal with the requirements of the dental and minor ailments treatment clinics. The appointment of an additional dental surgeon is badly needed.

Stockport.

Dr. Arthur G. Jenner reports that the housing question is still unsatisfactory. The work of the various health centres—namely, tuberculosis, V.D., and child welfare—has progressed favourably during the year. It is doubtful if the maternity home (10 beds) will be large enough to meet the increasing demands made upon it.

SCHOOL MEDICAL SERVICE.

Cumberland.

AN instructive and outstanding feature of this report is the appendix containing a detailed survey of the county scheme for dealing with cripples. Up to the end of 1922 a total of 257 cases of crippling had been brought to the school medical officer's notice, and of these over 95 per cent. were cases of serious crippling ranging from simple club-foot to paralysis involving all four limbs. Interest in the scheme appears to have been thoroughly stimulated in the county, and names were submitted by members of the Education Committee, by the medical and nursing staff of the county, by the organisers of physical training, by private practitioners, teachers, and members of the general public. Dr. Kenneth Fraser, the deputy school medical officer, reports that the weakest point in the organisation is the discovery of early cases—that is, children under school age. With all these sources of information the register is not yet made up to date and new cases are coming to light every week. Owing chiefly to the fact that the numbers and length of stay would be an impossible tax on the local cottage hospitals, the cases are sent to hospitals outside the county—Shropshire Orthopædic Hospital and the Ethel Hedley Hospital, Calgarth Park, Windermere. Cases are classified according to urgency either on clinical grounds or on age.

After-care is a fundamental part of the scheme, and under this heading is included not only the after-treatment of hospital cases but the preliminary treatment by plaster, remedial treatment, &c., of cases before admission, in order to shorten the period of stay. Under it is also included the provision of appliances and re-education. The development of an adequate system of after-care has presented more difficulty than all the rest of the scheme put together

and remains the greatest tax on the medical and nursing staff. At the beginning of 1921 a joint scheme of after-care with other counties was approved, and four after-care clinics were established at Carlisle, Maryport, and Whitehaven, and after some delay the first clinics were held in August, 1922, and have been eminently successful; altogether 82 children have attended, making 174 attendances.

Remedial treatment and re-education is a fundamental part of the treatment, and the seven clinics for such treatment have been established in the county. These are used by some patients as a preliminary to hospital treatment and serve to shorten the time spent in hospital, thus reducing the cost. They are, of course, most useful in preventing the further development of slighter deformities. It appears most unfortunate that all remedial treatment in the elementary schools and in a number of secondary schools of the county has ceased since December, 1922, owing to the so-called economy campaign. A few points are given at the end of the report for authorities contemplating a scheme for dealing with cripples, and Dr. Fraser lays emphasis on the necessity for careful organisation of after-care, with a person in charge who knows all about plaster and appliances work and something about re-education of muscles.

During the year 12,548 school medical inspections were made, and Dr. F. H. Morrison has followed out his practice of the previous year and has not resumed the weighing and measuring of children, and the services of three whole-time nurses have been dispensed with.

Soke of Peterborough.

Of the 317 secondary school-children examined, only one case of uncleanliness was recorded. Again Dr. Christopher Rolleston acknowledges his indebtedness to the school nurse. "I am every day, in every way and in every respect more and more indebted to Nurse Bean for her valuable services." In addition to attending at all medical inspections and reinspections, she has made 4990 examinations for cleanliness and paid 470 visits to homes on account of non-attendance from illness. She also paid 574 home visits for the purpose of arranging for treatment of physical defects. Dr. Rolleston, commenting on our lamentable lack of bathing facilities, recalls how grossly inefficient our arrangements for cleanliness are compared with the time of the Roman Empire. "Even small farmhouses near Pompeii were provided with bathrooms. Surely the freedom from certain forms of contagious disease in classic times depended on this wise expenditure of public and private funds." Dr. Rolleston's report is as usual most interesting and packed full of instructive suggestions.

MENTAL HOSPITALS SERVICE.

THE annual report of *Croydon Mental Hospital*, Warlingham, records with some satisfaction a recovery rate for the year of 57 per cent. This institution, which was opened in 1903, was the first in England to be described as a mental hospital, and may, therefore, be said to have set an example to which some of the subsequent progress elsewhere is indebted. Its therapeutic resources resemble those of a general hospital, and importance is attached to the value of specialised methods of treatment. The hospital is at present overcrowded to the extent of 51 males and 39 females, and it seems possible that contracts with other institutions may be necessary in order to relieve this congestion. The post of pathologist and third assistant medical officer is vacant.

At the *Worcestershire Mental Hospital*, Barnsley Hall, Bromsgrove, the post of second assistant medical officer is vacant, and it appears that only one medical officer, in addition to the superintendent, is at present available for the care of about 730 patients. No explanation of the apparent failure to fill this vacancy appears in the report. No report of a Commissioner of the Board of Control appears in this issue.

Correspondence.

"Audi alteram partem."

HEART DISEASE IN EARLY LIFE.

To the Editor of THE LANCET.

SIR,—Dr. G. Arbour Stephens's letter on the above subject in your issue of to-day's date deals with the great divergence of opinion as to the value of the salicylates in the treatment of the acute rheumatic state, which found expression at the recent meeting of the British Medical Association; and it urges the appointment of a commission to investigate the whole problem. I fear that, in view of this great divergence, the labours of such Commission would not bear much fruit, and this very largely because of the strange mental attitude (so it strikes me) of many doctors towards remedial treatment, especially by drugs. Thus Dr. Stephens uses the term "powerful poison" when speaking of the salicylates. Now the question of poison for every medicament is wholly a matter of dose, and, given careful dosage, surely the great body of medical opinion would pronounce unhesitatingly in favour of the salicylates as valuable remedies in acute rheumatism; or would anyone propose that we should revert to the use of the unaided alkalies, blisterings, &c., which our predecessors were so thankful to exchange for the salicylates?

One contributor to the B.M.A. discussion describes "the treatment of rheumatism by pharmacopœial doses of salicylates as only playing with a serious disease." I gather that what is meant is that we must go to the root of the matter and prevent rheumatism. The answer would be, "By all means this must be our endeavour"; but *meanwhile*, until we have reached that goal, and when faced by the attack, do we know of any other means of cutting short and mitigating the disease so effective as the salicylates? And is the alleviation of disease "playing" with it? Another holds that salicylate has not "diminished the incidence of carditis"—that is a statement very difficult of proof, but supposing it to be established, what then? Why then do not use it for that purpose; be content with lowering and cutting short the fever and relieving the pain. If it be impossible to prevent the entry of the "strong man" upon the scene, we can at least mitigate the situation by disarming him in part.

Let us then use a drug for what it can do and not abuse it for that which it cannot compass; remembering always that there is but one rule in treatment—namely, to reach back into the morbid sequence of cause and effect *as far as we can and attack it there*; so doing we shall prevent or palliate, as the case may be, secundum artem.

I am, Sir, yours faithfully,

HARRINGTON SAINSBURY.

Wimpole-street, W., Sept. 1st, 1923.

DECAPSULATION OF THE KIDNEY IN ECLAMPSIA.

To the Editor of THE LANCET.

SIR,—The growing experience that decapsulation of the kidney in eclampsia with anuria is a life-saving procedure—an example of which you quote and discuss in your issue of August 18th—calls for some comment; and especially for this, that it presents the climax of the argument that eclampsia is simply the result of visceral disabilities determined by mechanical circulatory difficulties arising locally in pregnancy. It shows that the convulsions are not due to some specific toxin, or to the absence of some specific anti-body, as some have supposed, but result from failure of the excretory organs. Already the idea of a specific toxin in pregnancy (whether placental or endocrinal in origin), producing a toxæmia and eclampsia, is decadent—the results of the Dublin treatment indicate plainly enough that the pre-eclamptic toxæmia is

simply a toxæmia due to an accumulation of "normal" waste products in the blood, that eclampsia is simply a uræmia. But the effect of decapsulation of the kidney indicates that the visceral disability (as far as the kidney is concerned) is caused by a circulatory difficulty arising within the kidney itself. Thus, in the case you have quoted, you refer to "the rapidity with which the operation had effect"; the effect, indeed, "was immediate." "Most recent authors," you say, "take the view that the chief effect lies in the mechanical relief of the renal tension," and, indeed, that "the French writer Pousson speaks of 'glaucoma of the kidney.'"

This last remark interests me greatly, for I have for long regarded the necrosis of the retinal cells in glaucoma as analogous with the necrosis of the renal cells in eclampsia, and have discussed the pathology of the former condition with certain ophthalmological friends. Just as in glaucoma the eyeball becomes "stony," so in eclamptic anuria is the kidney found "hard." It is plain that if the tension within the eyeball rises sufficiently the blood flow through the retinal capillaries will cease; and it is clear that if this obstruction persists, a necrosis of the retinal cells must occur. If the condition is recognised early and dealt with, the loss of vision (due to a functionless state of the cells) is restored; but if the condition persists, relief of the tension, even though it restore the blood flow through the retinal capillaries, cannot be hoped to give good functional results since the cells have become dead. The condition of the kidney in eclampsia is similar; in early stages (of anuria) the loss of function can be restored by re-establishing the flow of blood through the renal capillaries; but if the anuria persists several days (as in some reported), decapsulation of the kidney, even though it restore the blood flow through the kidney, cannot be expected to have the same result. Thus, decapsulation of the kidney should be done as soon as anuria is discovered, or as soon as it is found to persist in spite of all other measures.

How the increase of intra-ocular tension ending in glaucoma arises does not concern me; in the case of the kidney in eclampsia, there are two possible views. There is the view that the state of the kidney arises simply from the effect of a specific toxin or of the rise of normal waste products in the blood, and there is the view that it is due to mechanical circulatory difficulties induced within the organ by the pregnancy. It is difficult to understand, if the lesion affecting the renal cortical cells is due primarily to the effect of a poison, how decapsulation can affect the tissue. Were the renal lesion in eclampsia inflammatory in type, the case would be different, but it is non-inflammatory. There is a certain amount of round-celled infiltration, but Ludwig (1864)[1] showed that such occurred if one clamped the ureter even for one hour. He also showed that the kidney swells, that the uriniferous tubules become dilated, that the blood flow from the renal vein is reduced. Brodie (1914) showed that if a state of diuresis is induced and the ureter clamped the kidney swells, becomes tense and hard, and "almost bloodless"; and that if the kidney be decapsulated and the ureter clamped the uriniferous tubules and Bowman's capsules become much more dilated, the whole organ becoming larger.[2] Clamping the ureter, obviously, must cause the uriniferous tubules to distend; and it is clear that the distension of these tubules, reacting with the capsule of the whole organ, must obstruct the blood flow through the renal capillaries.

Whilst in the past certain authors have thought that ureteral obstruction—e.g., at the pelvic brim—is a cause of eclampsia, we must believe that the dilatation of the cortical uriniferous tubules (such as Clifford White found in his cases[3]) is due to a mechanical difficulty arising within the kidney itself; that a block occurs, for instance, in the intermediary zone, causing a distension of the cortical uriniferous tubules which determines an occlusion of the blood capillaries about these tubules and the prevention of a blood flow through. This idea is supported by the occurrence of anuria as a result of rapid relief of urinary pressure in such cases as those of long-standing congenital phimosis and prostatic disease.[4] It is not very difficult to work out the process ending in such a block, at least in the latter conditions; but I must not encroach on your space to unfold this idea. It is obvious that on decapsulation of the kidney in such a state the intra-renal tension will be immediately reduced; that not only can the blood flow more readily through the kidney (in the absence of thrombosis), but that urine in cortical uriniferous tubules can more readily escape. That such a tension in eclamptic anuria exists is shown (as I have indicated) by the hardness of the kidneys found at operation (it is a state to which C. White expressly refers); and that such a mechanism is in play is demonstrated by the rapidity of the effect of the operation. The good results of decapsulation show that the degeneration and necrosis of the renal cells are not due to a primary thrombosis (the thrombosis, as I have previously urged, is secondary, not primary[5]); nor can we believe that cases of symmetrical necrosis of the renal cortex (an end-result of the condition we are considering) is due to an endarteritis to which it has been referred. The necrosis, presumably, is a late result (as is the retinal necrosis in glaucoma); and we must believe that had decapsulation been performed early enough in such cases restoration of function most probably would have resulted.

I am, Sir, yours faithfully,

R. H. PARAMORE, F.R.C.S. Eng.

Brook-street, W., August 23rd, 1923.

[1] Ludwig: "Ueber die Beziehungen zwischen dem Bau und der Leistung der Niere," Wiener Med. Wochenschr. Ap., 1864, No. 15, p. 226.

[2] Brodie: A New Conception of the Glomerular Function, Croonian Lecture, Proc. Roy. Soc., 87B, 571–592.

[3] C. White: Two Cases of Puerperal Anuria, Proc. Roy. Soc. Med., Obstet. and Gyn. Sec., 1919, vol. xii., p. 27.

[4] Paramore: Remarks on Uræmia, Proc. Roy. Soc. Med., Urol. Sec., vol. xvi., No. 5, p. 29. (November, 1922.)

[5] Paramore: Eclampsia and Its Incidence, THE LANCET, 1921, ii., 1147.

ACCIDENTAL VACCINIA.

To the Editor of THE LANCET.

SIR,—In view of the prevalence of vaccination it may be of interest to refer to an incident which occurred recently in my own practice. On the evening of July 24th a woman visitor from Birmingham consulted me for an "insect bite" on her right upper eyelid. She stated that the swelling had begun to appear on the morning of the 23rd, but evidently it had spread, for when I saw her she was quite featureless, while the puffiness of the lids was so pronounced that she could not see out of her right eye. In the centre of the upper lid was a scab, but it was not until this scab had been removed by bathing with warm hydrogen peroxide solution that I was able to obtain a clear view of the underlying cause. Then there appeared a clear vesicle rather larger than a sixpence deeply embedded in the tissues, and with a circular depression in the centre having all the appearances of a vaccination mark prior to the development of the pustular stage on the sixth or seventh day following inoculation of the virus. This led me to make further inquiries, and thus I came into possession of some quite useful information. Briefly the sequence of events was as follows:—

July 6th: Baby vaccinated, arm left uncovered.

17th: Baby scratched his mother on upper lid; the mark left by his finger-nails was clearly visible on the following day.

23rd: Lid began to swell up.

24th: A fully-formed vesicle was apparent in that situation, and developed after the manner of a cow-pox vesicle.

31st: The vesicle had shrivelled up, but the scab remained adherent while showing signs of separating at the margin. All traces of the swelling had gone.

It is probable that I should not have recognised the condition had it not been for a similar experience which befell me in the out-patient department of the

Westminster Hospital in the spring of 1906. One day a woman presented herself with an angry-looking pustule on the cheek, which I at first mistook for a malignant pustule, until my mind was set at rest by the surgeon in charge of out-patients inquiring all about the health of some infant of whose existence he seemed to be perfectly well aware, although he had not, so far as I could tell, ever been informed of its arrival.

Probably on account of the rarity of vaccination on parts of the body other than the arms and legs, no mention is ever made of the possibility of this condition being mistaken for that of anthrax, yet the resemblance is very close when, as in the case just mentioned, there is an outer ring of vesicles, and a *dark* scab forms from admixture with blood. The history is the most important thing, and next to that the presence or absence of severe constitutional disturbance. Even so, it is as well to bear in mind that vaccinia is sometimes severe, and that not every individual infected with anthrax is doomed.

I am, Sir, yours faithfully,

Bournemouth, August 30th, 1923. J. STANLEY AVERY.

THE FORAMEN OF MAGENDIE.

To the Editor of THE LANCET.

SIR,—May I remind Prof. Wood Jones that Sir John Bland-Sutton's discovery of the non-existence of Magendie's foramen has been confirmed by F. Coupin, who shows, in addition, that the two lateral foramina of Luschka are also artefacts. The roof of the fourth ventricle is extremely fragile, and is very easily torn in dissections or in preparation of microscopical sections. Coupin found that all these three foramina are absent in the mouse, rat, guinea-pig, kitten, and young rabbit; and in his second paper he found the same thing in scyllium canicula, torpedo, carassius, and rana temporaria. In none of these animal forms is there any direct communication between the cavity of the fourth ventricle and the subarachnoid spaces. His papers are in the "Comptes Rendus de la Société de Biologie," (*a*) 1920, lxxxiii., p. 954, and (*b*) 1921, lxxxiv., p. 913.

I am, Sir, yours faithfully,

London, N.W., August 31st, 1923. LEONARD J. KIDD.

THE STATUS OF PATHOLOGY.

To the Editor of THE LANCET.

SIR,—The science of pathology is a branch of biology, but, while all other branches of biology are recognised as sciences by our universities, no university recognises pathology as such, nor is the Pathological Society regarded as one of the scientific societies. Pathology is rather regarded with contempt as a branch of medicine which any medical man is competent to teach. Hence we sometimes find that important posts in pathology are filled by the appointment of men who have had no experience in the subject, while those who have spent years in junior posts are passed over. We also find in some universities that the pathological department is run on commercial, rather than on scientific, lines, and it is the only department to be exploited in this manner.

Will not one of our universities take the initiative in raising the status of pathology—

1. By instituting a chair of general pathology.
2. By recognising general pathology as a subject for degrees in the faculty of science.
3. By establishing a course of training for pathologists of a standard equivalent to that of the honours courses in other branches of science.
4. By imposing on the staff of the pathological department the same restrictions as to outside work as are imposed on the staffs of other departments.

I quite recognise that there may be a difficulty in recognising pathology as a subject for science degrees, because, owing to the nature of the subject, the degree would, almost of necessity, have to be a post-graduate degree. If these difficulties are held to be insuperable a diploma might be instituted.

I may say that it is not only the universities which regard pathology with contempt. The medical profession itself regards the pathologist as an inferior order of being to whom the rules of medical etiquette do not apply. What an outcry there would be if the universities carried on clinical practice by means of their professors and lecturers in clinical subjects as they now carry on pathological diagnosis by means of their pathological staffs!

I am, Sir, yours faithfully,

Manchester, Sept. 1st. CHARLES POWELL WHITE.

LONDON PANEL: POST-GRADUATE COURSES.

To the Editor of THE LANCET.

SIR,—Further courses of post-graduate instruction have been arranged by the London Panel Committee with the assistance of the authorities of Guy's Hospital, to take place in the coming autumn. The courses will be held in general medicine, midwifery and gynæcology, and in the diseases of the ear, nose, and throat. Each course will consist of ten lectures of one hour's duration and will probably commence on Sept. 20th. The classes will be held simultaneously on Thursday afternoons at 4 P.M. The fee for each course will be £3 3s., payable in advance to me, and cards of admission will be issued. There will be special instruction in the treatment of diabetes by insulin and in the treatment of tuberculosis by Dreyer's diaplyte vaccines. Early application for inclusion in either of the above courses should be made as the numbers admitted will be limited.—I am, Sir, yours faithfully,

ROBT. J. FARMAN,
Secretary, Panel Committee for the County of London.
Staple House, 51, Chancery-lane, W.C. 2,
August 29th, 1923.

Obituary.

ERNEST FRANCIS BASHFORD, O.B.E., M.D., CH.B. EDIN.

Ernest Francis Bashford died suddenly of heart failure on August 23rd, at Manderscheid, Eifel, Germany, at the early age of 49. He was born at Bowdon, Cheshire, in 1873, educated at George Heriot's Hospital School and Edinburgh University, graduating M.B., Ch.B. in 1899 and M.D. 1902, after a distinguished academical career. He travelled to Germany as holder of the McCosh Scholarship of Edinburgh University, and later of a Grocers' Scholarship, and studied under the late Prof. Ehrlich at Frankfort. Later he was assistant to Prof. Liebreich in the Pharmacological Institute in Berlin. He returned to Edinburgh in 1902 as assistant to Sir T. R. Fraser, and while there published his well-known monograph on the pharmacological antagonism of atropine and morphine.

In 1902 Bashford was appointed director of the newly founded Cancer Research Fund, a position which he held till 1914, when he resigned through ill-health. During these 12 years he held a prominent position in cancer research in this country and on the Continent, and built up the organisation of the Imperial Cancer Research Fund as an experimental research institute. His work at the Imperial Cancer Research Fund will best be remembered by the numerous contributions on the zoological and ethnological distribution of cancer, national and hospital statistics, the phenomena of transplantability of animal tumours and the induced resistance to them. Into the controversies which raged around these topics he threw himself with enthusiastic energy.

Dr. Bashford served in the R.A.M.C. from 1915 till the end of the war and afterwards in the Army of Occupation till some months before his death. He leaves a widow and one daughter, to whom the greatest sympathy will be extended.

EDWARD ALEXANDER WHITE, M.D., M.CH., L.M. R.U.I.

Dr. E. A. White, the oldest practitioner in the Isle of Thanet, died at Margate on July 18th, aged 70 years. He was educated at Queen's College, Belfast, and qualified M.D., M.Ch., and L.M. in 1877. After practising for a short time in London, he entered into partnership at Margate with the late Mr. W. H. Thornton and the late Mr. W. Knight Treves, nearly 50 years ago. For many years he held the appointment of visiting physician to the Isle of Thanet Isolation Hospital, a post which he gave up a few months ago owing to failing health. On his resignation he was appointed consulting physician to the hospital. In his earlier years in Margate he was district medical officer, and held numerous club appointments before the National Insurance Act was passed. He was also surgeon to the local battery of the Cinque Artillery Volunteers, resigning his commission when the Territorial system was introduced. Ten years before his death White underwent a grave operation and afterwards gradually relinquished active practice, though he attended some of his old patients until a few weeks before his death from cerebral hæmorrhage. His last public appearance was at the dedication of the "White" bed, which he endowed at the Margate Cottage Hospital in memory of his second son, who gave his life on the shores of Gallipoli. Edward White was greatly loved by his patients, and though his activities had been greatly limited by his loss of health, those who knew him in his prime will always cherish the memory of one who was a kind and generous friend as well as a beloved physician.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Comrs. W. H. Edgar to *Cyclops*; F. E. Bolton to *Victory*, for R.N. Hospital, Haslar, and as specialist in diseases of the nose, ear, and throat, temp.; H. M. Langdale to *Dolphin* and as Senior Medical Officer of Submarines; F. G. Hitch to *Pembroke*, addl., for R.N. Barracks, Chatham; and S. W. Grimwade, O.B.E., to R.N. Hospital, Plymouth; H. B. Ormsby to *Caledon*; and E. H. Townsend to *Calcutta*, and as Squadron Medical Officer (on recommg.). C. V. Griffiths, D.S.O., L. Lindop, H. H. Babington, E. C. Holtom, O.B.E., E. C. Sawdy, and F. Cock to *President*, addl., for three months' hospital course.

Surg. Lt.-Comrs. H. B. Barker, D.S.C., to R.N. Hospital, Malta; A. C. Shaw to *Valiant*; C. M. Williams to *Warspite*; H. Wilks to *Pembroke*, addl., for Sheerness Yard; J. B. Crawford to *Victory*, addl., for R.M. Division, Forton, temp.; J. T. Wylie to *Dwarf*, on recommg. (to take passage in *Ajax*); and J. T. Wylie to *Fitzroy* (appt. to *Dwarf* cancelled).

Surg.-Lts. T. Madill to *Victory*, for R.M. Eastney, temp.; A. G. L. Brown, D.S.C., to *Dwarf* (on recommg.), to take passage in *Ajax*; N. A. H. Barlow to *Queen Elizabeth*; J. W. Tighe to *Campbell*; and A. P. Anderson-Stuart to *Southampton*.

Surg.-Lt. J. A. Ainley, is promoted to rank of Surg. Lt.-Comdr.

ROYAL NAVAL VOLUNTEER RESERVE.

Late Temp. Surg. (R.N.) J. E. Purves transferred to permanent list of R.N.V.R. as Surg.-Lt. and attached to the Scottish Division, List II.

The following late temp. Dental Surgeons have been transferred to the permanent list as Surg.-Lts. (D.): T. P. Cooper (attached to London Division, List 11); G. W. E. Holloway (attached to London Division, List 11); A. G. D. Pridham (attached to Bristol Division, List 11); D. C. Lamond (attached to Scottish Division, List 11); E. G. Parkinson (attached to London Division, List 11); G. R. D. Hankinson (attached to Sussex Division, List 11); and A. C. Bloomer (attached to Tyne Division, List 11).

ROYAL ARMY MEDICAL CORPS.

Maj. W. W. Browne, O.B.E., relinquishes the temp. rank of Lt.-Col.

Capt. H. D. Lane, M.C., retires receiving a gratuity and is granted the rank of Maj.

Lt.-Col. H. F. Shea, D.S.O., is restd. to the estabt.

Capt. P. Carney, M.C., retires receiving a gratuity and is granted the rank of Maj.

TERRITORIAL ARMY.

Capt. F. B. Chavasse, M.C. (late R.A.M.C.), to be Capt.

INDIAN MEDICAL SERVICE.

Lt.-Col. E. L. Perry, D.S.O., to be Col.

The King has approved the retirement of the following officers: Col. R. G. Turner, C.M.G., D.S.O.; Sen. Asst. Surg., with rank of Maj., E. J. Murphy.

The King has approved the relinquishment of his temp. commn. by the following officer: Capt. Gnanadickam Ira Benjamin, and is permitted to retain the rank of Capt.

ROYAL AIR FORCE.

Flying Officer J. D. Leahy, M.C., is granted a permanent commission.

The following appointments in the Royal Air Force are notified: Flight-Lt. (Medical) A. F. Rook to R.A.F. Central Hospital, Finchley; Flying Officer G. Clark to R.A.F. Hospital, Cranwell.

Medical News.

CIVIL SERVICE OFFICERS: REDUCTION OF BONUS.—A circular, No. 439, has been issued to local authorities by the Ministry of Health setting forth the new scale of reduction of bonuses payable to permanent civil servants. On wages and salaries not exceeding £500 per annum the bonus will be reduced from Sept. 1st, 1923, by a further 1–26th (making 11–26th in all since September, 1921). This scale is based on an average cost of living figure of 75. In the case of salaries over £500 a year a corresponding reduction of bonus will be made, and the bonus will still be subject to the special percentage deductions specified in paragraph 2 of the statement appended to the circular No. 233 of August 30th, 1921, subject to the following provisos: (1) That ordinary remuneration above £500 a year shall not involve lower total remuneration than ordinary remuneration of £500 a year. (2) That the higher percentage deductions specified in the statement take effect at the exact £700, £800, &c., of ordinary remuneration, and the total remuneration for those points constitute a maximum which may not be exceeded in the case of remuneration just below, for which the percentage deduction is lower. (3) That in no case shall bonus be payable at a rate which will raise the total remuneration above £2000 per annum. In so far as insurability under the National Health and Unemployment Insurance Acts is determined by rate of remuneration, Civil Service officers (employed otherwise than by way of manual labour and in receipt of bonus on the Civil Service scale) whose salary plus the reduced bonus does not exceed £250 per annum should thus be treated as insurable from Sept. 1st.

THE "FIELD" DISTEMPER FUND.—The buildings, for which the Fund has authorised the payment of £3540, are shortly to be erected on a portion of the ground on the experimental farm of the Medical Research Council at Mill Hill. The portion of the ground reserved for this investigation will be surrounded by an unclimbable fence forming a compound in which will be situated the kennels and the bungalow for the kennel maids; while in the wall of the compound will be placed a building to be used as a cleansing room, which will afford the only means of egress or ingress into the compound. There will be also in the wall of the compound another building to be used as a store and for preparing the food for the dogs, which will be passed through a small hatch and carried away in a sterile vessel. Coals will be carried into the compound through a similar hatch. The cleansing room consists of an outer chamber, a bathroom, and an inner chamber. All persons who have to enter the compound, as well as the kennel maids, must pass through this building; on entering they have to leave their outer garments in the first chamber, have a bath, and put on sterilised clothes in the inner chamber before entering the compound. The bungalow for the kennel maids is already built, and contains good sleeping and sitting-room accommodation, and a good cooking range. The kennels are arranged eight on each side of a corridor covered with corrugated iron and floored with cement; there is an open space between each set of two kennels, so that at any time two or four can be isolated. Each kennel is 8 ft. square, with a yard 36 ft. by 8 ft., and these yards are divided from each other by 6 ft. compo. wood divisions. The floors of the kennels will be of asphalt, and the yards will be floored with ashes, so that in the case of infection they can be replaced, limed, and disinfected. The roofs of

the kennels will be made of ruberoid. The only other entrance into the compound will be the gate for the admittance of the dogs; the key of this gate will be kept by Mr. J. B. Buxton, F.R.C.V.S., who is in charge of the establishment. The hospital will not be situated within this compound, but at some distance away. It will be so constructed that if one side became infected that side could be completely shut off from the other side, and the experimental work could still be carried on in the uninfected portion. The hospital will be made fly-proof. It is further announced that an American Distemper Committee—several member of which have been coöpted on the British Council—has been formed. Sir William Leishman, F.R.S., having resigned from the Special Research Committee owing to his recent appointment as Director-General, Army Medical Services, Dr. C. J. Martin, F.R.S., has been appointed chairman of this committee.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE, SPECIAL COURSE IN INFANTS' DISEASES, at the Infants Hospital, Vincent-square, Westminster, S.W.

MONDAY, Sept. 10th.—2–3.30 P.M., Dr. William Robinson: Lymphatic Diathesis. 4.30–6 P.M., Dr. Eric Pritchard: Demonstration: Uses of Dried Milk.

TUESDAY.—2–3.30 P.M., Dr. Eric Pritchard: Acidosis in Infancy. 4.30–6 P.M., Dr. Helen Mackay: Nutritional Diseases with special reference to Rickets and Scurvy.

WEDNESDAY.—2.30–3.30 P.M., Dr. Helen Mackay: Cases illustrative of Nutritional Disorders in the Wards and Out-patient Department. 4.30–6 P.M., Dr. Donald Paterson: Blood Conditions in Infancy; Demonstration in Research Laboratory.

THURSDAY.—2–3.30 P.M., Dr. Donald Paterson: Nerve Cases in the Wards and Out-patient Department. 4.30–6 P.M., Dr. Eric Pritchard: Demonstration in Milk Laboratory; Modification and Preservation of Milk.

FRIDAY.—2.30–3.30 P.M., Dr. Eric Pritchard: Round Table Consultation. Special Cases for Diagnosis. 4.30–6 P.M., Mr. Tyrrell Gray: Lecture: Pyloric Stenosis. Demonstration and operation if possible.

SATURDAY.—Expedition by motor charabanc to Nursery Training School, Garden Suburb, Hampstead, and Sunshine House (Home for Blind Babies), Chorley Wood, leaving Royal Society of Medicine, 1, Wimpole-street, at 2.30 P.M.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith-road, W.

MONDAY, Sept. 10th.—10 A.M., Mr. Maingot: Surgical Pathology. 12 noon, Mr. Simmonds: Applied Anatomy. 2 P.M., Mr. Addison: Surgical Wards.

TUESDAY.—10.30 A.M., Dr. Paterson: Medical Wards. 12 noon, Dr. Burrell: Chest Cases. 2 P.M., Mr. Sinclair: Surgical Out-patients.

WEDNESDAY.—2 P.M., Mr. Gibb: Eye Department. 3 P.M., Dr. Pernet: Skin Department.

THURSDAY.—12 noon, Mr Simmonds: Demonstration of Fractures. 2 P.M., Mr. MacDonald: Genito-Urinary Department. 3 P.M., Dr. Scott Pinchin: Medical Out-patients.

FRIDAY.—10 A.M., Mr. Dudley Buxton: Dental Department. 2 P.M., Dr. Burrell: Medical Out-patients. 2 P.M., Mr. Sinclair: Surgical Out-patients.

SATURDAY.—10 A.M., Dr. Paterson: Medical Diseases of Children.

Daily, 10 A.M. to 6 P.M. Saturdays 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

Appointments.

CARDON, A. G., M.B., B.Ch., has been appointed Assistant School Medical Officer, Sheffield.

MACKENZIE, ELIA, M.B., Ch.B. Edin., D.P.H., Assistant Medical Officer of Health of Blackburn.

Manchester Royal Infirmary: WITTS, L. J., M.B., Ch.B. Manch.; COLEMAN, A., M.B., Ch.B. Manch.; BARLOW, A., M.B., Ch.B. Manch., House Physicians. PARKES, M., M.B., Ch.B. Manch.; FOULDES, E. J., M.B., Ch.B. Manch.; LATHAM, T., M.B., Ch.B. Manch.; BOWMAN, B., M.B., Ch.B. Manch.; FLEMING, W. A. J., M.B., Ch.B. Manch., House Surgeons. SHARP, C. J., M.B., Ch.B. Manch., House Surgeon to Special Departments. BRYCE, A. G., M.D. Manch., F.R.C.S., Surgical Registrar.

Vacancies.

For further information refer to the advertisement columns.

Aylesbury, Royal Bucks Hospital.—R.M.O. £200.
Bristol Royal Infirmary.—H.S. to Ear, Nose, and Throat Dept. £120.
Carnegie Dunfermline Trust, Abbot-street, Dunfermline.—Asst. M.O. £550.
Central London Throat, Nose, and Ear Hospital, Gray's Inn-road, W.C.—Two Asst. Surgs. and Three Registrars.
Chester Royal Infirmary.—Asst. H.S. £150.
Dreadnought Hospital, Greenwich.—H.S. and H.P. Each £150.
East African Medical Service.—M.O. £600.
Exeter, Royal Devon and Exeter Hospital.—Asst. H.S. £150.
Glasgow District Mental Hospital, Gartloch.—Jun. Asst. M.O. £350.
Halifax Royal Infirmary.—Third H.S. £150.
Leicester City.—Asst. Tuberculosis O. £550.
London County Mental Hospital Service.—Seventh Asst. M.O. £432.
Manchester, Ancoats Hospital.—Res. M.O. £200.
Newcastle-upon-Tyne, Hospital for Sick Children.—Jun. R.M.O. £140.
Newcastle-upon-Tyne Royal Victoria Infirmary.—H.P.'s and H.S.'s, residents. £50.
Queen's Hospital for Children, Hackney-road, E.—H.P. and Cas. H.S. £100.
Redhill, Surrey, Royal Earlswood Institution.—Jun. Asst. M.O. £250.
Royal Chest Hospital, City-road, E.C.—R.M.O. £200. Also H.P. £120.
Royal National Orthopædic Hospital, 234, Great Portland-street, W.—H.S. £150.
Royal Naval Medical Service.—Surgeon-Lieutenants.
Royal Northern Hospital, Holloway, N.—H.S. £100. M.O. £150.
Saint Pancras Dispensary, 39, Oakley-square, N.W.—Hon. S.
St. Peter's Hospital for Stone, &c., Henrietta-street, Covent Garden, W.C.—H.S. £75.
Salford Royal Hospital.—H.P. and H.S. £200. Also Cas. H.S. £150.
Samaritan Free Hospital for Women, Marylebone-road, N.W.—H.S. £100.
West African Medical Service.—M.O. £660.
West Bromwich and District Hospital.—Res. Asst. H.S. £180.
West London Hospital, Hammersmith-road, W.—H.P.; also two H.S.'s. £100.
Winchester, Royal Hampshire County Hospital.—H.P. £150.

The Chief Inspector of Factories, Home Office, London, S.W., announces the following vacant appointments: Stowmarket, Suffolk; Kirkwall, Orkney; Maidenhead, Berks.

Births, Marriages, and Deaths.

BIRTHS.

BLACKLEY.—On August 31st, at West Highwood, Walton-le-Dale, near Preston, the wife of F. J. Blackley, M.D., of a daughter.

BUTLER.—On Sept. 1st, at "Brookfields," West Kirby, the wife of G. Guy Butler, M.D., B.Ch., of Dar-es-Salaam, Tanganyika Territory, of a son.

CRAIG.—On August 28th, at Culmington-road, Ealing, W., to Eileen, the wife of Squadron-Leader E. W. Craig, M.B., B.Ch., R.A.F.—a daughter.

MURRAY.—On August 28th, at Osman House, Fortis Green, N., the wife of James R. Murray, M.D. Aberd., of a daughter.

MARRIAGES.

BETHUNE—PENNEY.—On August 13th, in London, Henry Norman Bethune, F.R.C.S. Edin., M.B. Toronto, to Frances Eleanor, only daughter of the late José Campbell Penney and Mrs. Campbell Penney, of Edinburgh.

HARVEY—MILLARD.—On August 25th, at Marylebone, Dr. William Harvey, to Florence Elizabeth Millard.

O'MULLANE—COWIE.—On August 30th, at the Church of Our Lady of Grace, Charlton, Jerome John O'Mullane, M.B., B.Ch., B.A.O. N.U.I., to Annette Isabella, eldest daughter of Dr. and Mrs. Cowie, Charlton, S.E.

TURTLE—BURTON.—On August 30th, at the Parish Church of S. Mary, Stansted, Essex, James Turtle, M.R.C.S., L.R.C.P. Lond., to Elaine Clara Constance, youngest daughter of Mr. and Mrs. Ernest L. Burton, of Stansted, Essex.

DEATHS.

CARTER.—On August 29th, suddenly, at The Lawn, Lord-street West, Southport, Weldon Cragg Carter, M.D. Lond., M.R.C.S., L.R.C.P. Lond.

HART.—On Sept. 1st, George Simpson Hart, M.D., of Measham, Burton-on-Trent, aged 55.

TAYLOR.—From heart failure after heatstroke, Alan Everley Taylor, M.A., B.M., Ch.B. Oxf., Surgeon City Line, formerly Resident Ophthalmic Officer, Leeds Infirmary, and Captain, R.A.M.C., 1914–1919.

WEBSTER.—On August 30th, at his residence, The Avenue, West Ealing, W., Ridley Manning Webster, M.R.C.S. Eng., L.R.C.P. Edin., in his 77th year.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

PUBLIC HEALTH IN ASSAM.

THE report on Public Health in Assam for 1921[1] deals only with the population of the plains districts of the province, the population of which districts is stated as 6,854,367, being an increase of 802,860 over that of 1911. (The population of the whole province (1921) is stated as 7,606,230 in Whitaker's Almanack, 1923.) The total births registered numbered 203,153, giving a ratio of 29·63 per 1000, as compared with 32·19 in 1915–19 and 31·53 in 1920; but this latter ratio was calculated on the population of the previous census, and if the 1921 ratio were calculated on that basis it would be 33·57—that is, there was really an increase in the births. In the other provinces of India the ratio varied from 27·05 in Madras to 41·50 in the Punjab (Bengal statistics are not available). In the districts of Assam the birth-rate ranged from 24·16 in Lakhimpur and 25·08 in Sibsagar to 32·30 in Sylhet and 33·58 in Goalpara. The death-rate was 26·48, against 36·17, the quinquennial average, and 27·77, the average for the pre-influenza quinquennium, 1913–17. This indicates that the public health has recovered from the after-effects of that visitation. In Sibsagar district the mortality was only 20·08; in Goalpara it was 34·02 per 1000. Cholera caused 12,829 deaths (1·87 per 1000, compared with 2·46, the decennial average). Among the rural districts Goalpara, in the Assam valley, suffered most, with a mortality of 3·66 per 1000; and after this Cachar, in the Surma valley (2·97). The largest number of deaths (5885) occurred in the populous Sylhet district (2·35 per 1000). In the towns, Gauripur (7·42), Habiganj (5·57). and Karimganj (5·27) had the highest ratios; the water-supplies in these places are unprotected and their sanitary arrangements primitive. The small-pox mortality was 0·40 per 1000, compared with 0·47 in the decennium. In the Darrang district the ratio was 2·38; the epidemic was confined to certain villages in the Mangaldai subdivision, where vaccination had been neglected. The total fever death-rate was 15·7 per 1000, as compared with 18·57 in 1920, 17·18 in the decennium 1911–20, and 14·91 in the pre-influenza decennium, 1908–17. Good results have followed on the carrying out of the Lumding anti-malarial scheme, the attacks per head per annum having been nearly halved, and the splenic index in the bazaars very largely reduced; similar satisfactory results have been reported at Pasighat. The mortality from kala-azar (2987 deaths) was somewhat higher than in 1920 (2798), and, indeed, was higher than in any previous year; but this was probably "to some extent due to an increased attention to the disease leading to a subtraction from the fever deaths and addition to the kala-azar deaths." Forty-three assistant and sub-assistant surgeons were employed on special duty, and 12 indoor hospitals, with a total of 226 beds, were open for reception of patients, in addition to accommodation in other hospitals and treatment at dispensaries; the total patients numbered 15,880. Lieut.-Colonel McCombie Young, I.M.S., Director of Public Health for the province, who presents this report, notes that "it is indeed a stimulating sight to see the troops of patients, mostly attending our dispensaries and hospitals, and voluntarily and cheerfully undergoing a treatment in which their chances of recovery are now equal to what were formerly the chances of almost certain death"; and "ventures the opinion that Government money has rarely been spent to better purpose in the saving of life and health."

The mortality from dysentery and diarrhœa was 1·68, compared with 2·37 per 1000 in the decennium 1911–20, varying from 0·33 in Goalpara district to 3·23 in Lakhimpur. There was an improvement in every district except Kamrup, where the ratio was 1·00, compared with 0·92 in the decennium. In the tea gardens the ratio was 5·25, varying from 2·30 in Kamrup to 7·21 in Lakhimpur. "Speaking generally, there is little doubt that something like half the mortality and inefficiency among the labour populations of tea estates is due to bowel complaints, and much of it is preventable by the introduction of modern methods of refuse disposal; as lack of conservancy, hookworm infestation, and bowel diseases, work together in a vicious circle to maintain the high mortality rates in question." There has been a period of financial depression in the tea industry, but expenditure in this direction, by leading to increased health and efficiency, will undoubtedly be a true economy in the end. In Sylhet district "the conservancy system suffered serious detriment as the result of a turn of municipal politics, whereby, in the name of retrenchment, nightsoil carts and animal traction were replaced by hand removal, with results that were to be expected. . . . The incident raises the question as to whether more control should not be exercised by Government over the results of the activities of municipal politicians when these are likely to endanger the health of the community." We suggest that "the answer is in the affirmative." Dibrugarh, in the Assam valley, is the only considerable town in the province now unprovided with a filtered water supply, having refused the offer when other towns were being equipped, and being still dependent on unprotected wells. No action appears to be contemplated. A sanitary inspector, now styled "health officer," has been appointed for each of the four towns of Habiganj, Sunamganj, Karimganj, and Sibsagar, as well as four rural health officers for as many local boards. It is too soon to offer any optimistic forecast as to the improvements in rural sanitation that may result, but "one ventures to hope that, when the present financial stringency disappears, it will be found possible to provide every local board in the plains districts with a health officer."

[1] Shillong: Assam Secretariat Press. 1922.

The Jail Population.

The jail population in this province averaged 2656 in 1921, as compared with 2514 in 1920. The convicts averaged 2314, an increase of 155 over the previous year, "mainly attributable to the non-coöperation movement; of the total number (4608) admitted, 1018 were for offences against the public tranquillity. There was a marked decrease in the female prisoners admitted, 78 as compared with 138 in the previous year; but there was an increase in the numbers of those who were able to read and write (5·27 per cent.), or to read only (0·41 per cent.), compared with 1·64 and 0·02 per cent. respectively in 1920; the increase was due to the non-coöperation prisoners, who mostly belonged to the educated class. "It is remarkable that prison offences are declining steadily, while the jail population is gradually on the increase"; the total offences numbered 2591, against 3030 in 1920 and 3688 in 1919. It might be suggested that this is because the standard of education has been higher. As regards the health of the prisoners, the admissions to hospital were 909·8, the average daily sick 39·5, and the mortality 35·38 per 1000; the corresponding ratios for the preceding year were 758·09, 35·77 and 25·06. It is noteworthy that the jail death-rate, which from 1915 to 1919 had been very considerably lower than that of the population of the province generally, in 1920 nearly equalled the provincial rate (25·06 compared with 28·98 per 1000), and in 1921 rose to 35·38, while the provincial rate fell to 26·48. The main cause of death was influenza, which "instead of passing in epidemic form through the jails, has been almost constantly present." Vaccine, either as prophylactic or curative, has not been successful. As compared with the jail statistics of other Indian provinces, the total Assam mortality (35·38 per 1000) was only exceeded by that in the Central Provinces (35·53); in the adjoining province of Bengal it was only 16 per 1000. By an obvious, but unfortunate, typographical error, the table on p. lxvii shows the deaths among convicted prisoners in the various jails of the province from diarrhœa as having been in a ratio of 941 per 1000.

Vaccination.

In the report on Vaccination for the three years, April, 1920, to March, 1923, it is stated that the total number of operations during this period amounted to 1,162,931, showing an increase of 77,558 on the preceding triennium. In the three years now reported on, however, the numbers were 418,936, 367,548 and 376,447, showing a considerable decrease in 1921–22, and only a very slight recovery in 1922–23; the decrease was due to the non-coöperation movement. The small-pox mortality in the province has naturally increased during the period: in 1919–20 it was 0·20 per 1000; in 1920–21, 0·24; in 1921–22, 0·35; and in 1922–23, 0·38. Where vaccination is performed the results are very satisfactory, the success ratio having been 94·91 per cent. for primary operations during the triennium, and 62·2 for revaccinations. The lymph is prepared at the Shillong dépôt, and is issued after having been kept three months in cold storage. All districts showed an increase in the number of operations, compared with the previous triennium, except Manipur State, where there was a decrease of 50,683, Kamrup (26,187), and Cachar (5096). The average number of operations per vaccinator in 1922–23 was 1108; in the Garo Hills district the average was 1652.

Mental Treatment.

In the Assam provincial lunatic asylum at Tezpur there were confined 413 patients at the end of 1920, and 105 were admitted during the year 1921. The daily average strength was 427, compared with 399 in the year preceding; 51 patients were discharged, of whom 49 were cured, and two "mentally improved." The admissions to hospital numbered 126, of which 24 were for dysentery and 15 for diarrhœa, as compared with 16 and 12 in the previous year. Colonel J. Garvie, I.M.S., Inspector-General of Civil Hospitals, who forwards this report, emphasises the dependence of dysentery on the filthy condition of the patients and site overcrowding. Of the new admissions to the asylum, 29 per cent. were in bad health and 45·3 with indifferent health on arrival. A hospital ward for dysentery cases is urgently required.

HEALTH CONDITIONS IN CYPRUS.

A REPORT for the year 1922 has been received at the Colonial Office on the affairs of this island, situated in the eastern Mediterranean. The island is about 140 miles in greatest length from east to west, and about 40 miles in greatest breadth from north to south. The population, as shown in the census return taken in 1921, was 310,709. Public health in 1922, except for a severe epidemic of measles throughout the island, was again good, the stringent quarantine regulations in force proving effectual in preventing the introduction into the country of plague, typhus, and other virulent diseases prevalent in most neighbouring countries of the Levant and the Near East. This complete immunity is the more satisfactory when it is considered that several thousands of refugees, many of the poorest class, found asylum in Cyprus from Smyrna, Cilicia, and Asia Minor. An outbreak of small-pox, which was brought into the island by Armenian refugees from Mersina, in Cilicia, at the beginning of the year, was immediately detected and suppressed; 86 cases in all were recorded, of which 16 were fatal. Some 50,000 vaccinations were carried out. Cyprus continued to be free from rabies, and the regulations prohibiting the importation of dogs from any destination were again strictly enforced during the year. The prevailing diseases were, as in 1921, those of the digestive and respiratory system, influenza, diseases of the skin, rheumatism, malaria, and enteric fever. The anti-malaria campaign was, as usual, conducted under the supervision of the medical officer of health, though the spleen-rate, which is regarded as the index of malaria in a country, showed a tendency to rise, a circumstance attributed to the rains which fell exceptionally late in the spring and early summer of 1920 and 1921. The births registered were equivalent to 28·0 per 1000, and the deaths to 29·0 per 1000 of the population, as compared with 26·6 and 19·8 respectively in 1921. The marked increase in the death-rate is attributed to the severe epidemic of measles already referred to, which caused a greatly increased mortality among children and infants, the death-rate for the latter under 1 year being 167·6 per 1000, as compared with 130·4 in 1921. The climatic conditions generally during the prolonged summer were exceptionally exhausting, and the great heat and excessive dryness proved fatal in many cases of old age and chronic sickness. There were Government-maintained or aided hospitals in operation in the six principal towns, and 16 rural medical officers worked among the village population. The new hospital at Limasol has been opened and is now in operation. Over 1300 patients were admitted to the Central Hospital at Nicosia, which is fitted with 56 beds, and the out-patients treated numbered rather more than 8000. Some 150 surgical operations were performed. More than 18,500 persons received relief at the rural dispensaries. The number of lepers detained in the Leper Farm at the close of 1922 was the lowest on record—i.e., 69, as against 90 in 1916, and 102 in 1909. The admissions to the Farm were only five, as against nine in the two previous years, and there were nine deaths, all of which were advanced cases of the disease. Some of the inmates were treated internally with chaulmoogra oil with good results, though no actual cure can yet be reported. The beneficial effect of segregation is beginning to tell, and leprosy in Cyprus is now well in hand, hopes being entertained that it may be possible entirely to eradicate it from the island. The number of children at the close of the year in the home for the healthy children of lepers was 10, all of whom remained free from any sign of the disease. The climate of Cyprus is, generally speaking, temperate and healthy, though the excessive heat of the plains during the summer is trying to Europeans. The heat is, however, dry, except on the coast, while the winters are cold and invigorating. The absolute mean temperature for the year at Nicosia was 66·90° F., as against the average of 65·80° for the last 15 years. The mean maximum temperature was 78·60° F., and the mean minimum 55·20° F. The rainfall for the last ten years has averaged 20·09 inches per annum; in 1922 the mean for the whole island was 18·41 inches, as against 22·44 in 1921. The experience of the last decade would seem to show that the climate of Cyprus tends slowly but surely to change. While the excessive heat in the plains still prevails during midsummer the winters are colder, and late rains not infrequently fall, even up to the months of May and June, a circumstance attributed principally to the conservation and extension of the island's forests.

THE EARLY DAYS OF LETTSOM.

AN account[1] compiled from letters, diaries, and minute books of the Quaker settlement (1741–1786) in Tortola, one of the Virgin Islands, is of medical interest because in Little Jost Van Dykes, an islet off Tortola, there was born in 1744 John Coakley Lettsom. His birth was remarkable in that he is said to have been one of the seventh pair of boy twins born to his mother, of which family he and his brother Edward were the sole survivors. His father was Edward Lettsom, who owned this and sundry other islets together with a cotton plantation on Tortola. Edward Lettsom died in 1754 and his widow married again. There is an amusing entry on p. 35 giving "the Widow Lettsom's" reply to chidings for not attending meetings: "Frinds slited her and set her at noat and she being left destitute from human help not a negro to assist her. Meetings being at a distance and thinking it hard to be slited by Friends in her distress, had quit attending meeting." Slavery was at this time not considered inconsistent with the profession of Quakerism or, indeed, of any other body of Christians, but it is notable that John Coakley Lettsom, who had been sent to England to be educated at the age of 6—i.e., in 1750—returned to Tortola more or less qualified as a medical man in 1767, when his first action was to free his slaves. The book gives a most interesting picture of a phase of eighteenth-century society very little known to most people.

[1] Tortola. By Charles F. Jenkins. London: Friends' Bookshop. 1923. Pp. 106. 5s.

SUSPECTED CASES OF PLAGUE AND CHOLERA.

IN a circular (No. 437) addressed to port and riparian sanitary authorities it is stated that in several recent instances the Minister of Health has not been informed promptly of the occurrence of suspected cases of plague on ships arriving in ports in this country, and there has also been delay in forwarding to the Ministry for bacteriological investigation material obtained from such cases. The Minister reminds sanitary authorities that under the International Sanitary Convention of Paris, 1911/12, the Governments of all countries participating in the Convention must immediately be notified by H.M. Government of the occurrence of any case of plague or cholera in this country, and it is therefore of the utmost importance that every suspected case of plague or cholera should at once be reported to him. Material from such cases, if obtainable, or from rats suspected to be suffering from plague, should, as soon as practicable, be forwarded to the Ministry for bacteriological investigation. Directions for the taking and transmission of such material have been forwarded to the port medical officers of health.

CODE WORDS FOR MEDICAL TELEGRAMS.

To the Editor of THE LANCET.

SIR,—May I make a small contribution to the possible ambiguities arising in reports of pathological findings? I found the following message on my slate when I came in the other day:—

"They rang up from the hospital to say the telegram has come through, that the swab from the throat is *maggoty* in the boy Smith."—I am, Sir, yours faithfully,

East Grinstead, August 28th. W. HENRY HILLYER, M.D.

*** The Post Office has recently replaced the word *negative* in code telegrams by *not found*.—ED. L.

"WHY AND WHETHER IN FIRST AID."

THIS useful little book (London: John Bale, Sons, and Danielsson, Ltd. 1923. Pp. 100. 1s.) was first prepared nearly ten years ago to explain the difficulties in first-aid raised by a large ambulance class, the author successfully putting himself in the position of the student who asks the question. The call for a fifth edition has now enabled Dr. N. Corbet Fletcher to answer a number of queries suggested by correspondents or necessitated by changes in the St. John Ambulance Association text-book. It can hardly fail in its present form to advance the efficiency of first-aid work.

AN INTERCEPTOR FOR DENTAL FOUNTAIN SPITTOONS.

AT the suggestion of Mr. Peyton Baly, M.R.C.S., L.D.S., I have designed a metal box 4 in. by 3 in. by 1¼ in., having at one end an inlet elbow-joint with sliding standardised nut for attachment to the cuspidor and upon the under-surface an outlet tube with perforated cover. A perforated removable framework of the same shape as the box, but of smaller dimensions, rests within the apparatus, and is enclosed in one of the surgical napkins used by dental surgeons. As the fluid from the bowl of the cuspidor streams into this receptacle it is filtered both by the small perforations of the metal and by the napkin before it passes through the perforated cover of the outlet. Sputum and other rapidly decomposing material is thus prevented from lodging in the rubber waste-pipe which, as now employed, acts as a trap for this material—a fact well known to those who have attempted to cleanse it by pushing a cork of the same diameter as the bore through it. The box can be easily cleansed by raising the lid and removing the internal fittings. At the end of the day the outlet tube may be closed by the supplied stopper and the box filled with a disinfecting fluid, or the entire instrument may be removed and sterilised by boiling. The need for some such device has long been felt by dental surgeons. The attachment is supplied by dental depôts.

Liverpool. R. M. CAPON, L.D.S.